

User's Manual

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Machine management

User's manual

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OVERALL PRESENTATION

The Skynam electronic control units are multi-purpose machines that can be re-programmed as many times as necessary to suit your application (as long as you take the number and types of inputs and outputs of the machine you have purchased into account).

Consequently, your ECU cannot be delivered with standard tuning:

Before using it, you have to tell the ECU which functions it has to take into account and give it the settings related to such functions.

IMPORTANT PRELIMINARY:

TUNEWARE:

The whole of the data needed by an ECU have been grouped together in a set named Tuneware.

The Tuneware is a file made up of:

- The description of the ECU functionment for Winjall use purpose.
- The system programme enabling your ECU to carry out measures automatically, to monitor its outputs as well as communicate with your PC.
- The application programme telling the ECU how to calculate and what to do with its measures and controls so as to, for example, monitor a device (an engine for example).
- The whole of the settings (calibrations, maps, etc.) required for the specific operations for that particular device.

MACHINE:

It is the nickname of the Electronic Control Unit

But 'machine' gives a more functional idea than ECU.

WINJALL:

If you want to load the Tuneware in the machine and, maybe, change its content, Skynam has developed some user-friendly, performing software called WINJALL.

This notice explains how the WINJALL works and it must have been supplied with another specific documentation for your application (engine management ECUs, emissions control, etc.).

If you want to work on a machine (ECU), you'll need:

Winjall, properly installed on a PC (Microsoft Windows operating system, preferably XP or even more recent)

A Tuneware corresponding to your machine (ECU) and to what you want it to do.

WINJALL DOCUMENTATION

This Version 1.33 documentation as well as the following ones have been specifically upgraded for the Winjall versions distributed from 17 September 2007, including Winjall V3.00

It contains major improvements compared to previous versions, some of the functions that are presented in this user's manual can't be found or are different from previous versions.

NOTABLY:

Since V2.00 Winjall version, internal structure of the Tunewares have been modified to increase data security and confidentiality: the Tuneware internal structure version changes from 1 to 2, and Winjall V3.00 also uses this new internal structure.

All the Tunewares provided by Skynam since Winjall Version V2.00 are built with this new structure, even the ones in the Archives directories.

For your own tunings Tunewares, Winjall systematically changes their structure.

No data relative to the ECU is modified by this structure modification (see function 'Close Tuneware' for details). It only concerns the data security.

For that purpose, 3 means are used :

- Each time you save a Tuneware, Winjall builds it with the new internal structure.
- Each time an old structure Tuneware is closed, Winjall looks at all the Tunewares in the same directory path to give them the new internal structure.
- To avoid Winjall to ask you, each time you close an old structure Tuneware, to save this Tuneware in the new structure version, you can use the function '**Tuneware acces / Security update of Tunewares structure**', detailed later in this documentation.

LAUNCHING THE WINJALL SOFTWARE

Before launching the Winjall software, you have to insert the licence protection USB key supplied by Skynam (called 'dongle'). With that dongle, Winjall can make out some special calculations about data and Tunewares.

This dongle has to stay in place during the whole of the WINJALL session.

Note that some partial or demonstration licences do not require the dongle for operating the WINJALL.

USER'S INTERFACE

I) WINJALL MAIN WINDOW:

The window in which Winjall is executed has been divided into two parts by a splitter so as to make displaying and using it easier.

The left part contains the list of ECUs connected to the PC (several machines may be connected to the PC by CAN-BUS at the same time). All the tuning pages are available for each separate ECU.

II) POPUP MENUS:

The WINJALL software is based on intensive use of popup menus.

They can be opened by right clicking on the displayed items:

a) In the machines tree (left window)

- on the WinjNet name : choose the communication interface to be used
- on the branch with the name of each machine: system functions of each machine
- on the branch state of each machine: state function of each machine
- on the Tuneware branch of each machine: management Tuneware functions of each machine
- on the Tuneware functions and sub functions branches of each machine: global selection and un-selection functions of the Tuneware application functions.

b) in the application function pages (right window)

- on the page tab: choose page shutting down
- on the name of the variables : specific management functions for the variables (measurements, calculations and data)
- on the variable data : specific functions for operation of the variables

MACHINE TREE

WINJNET is the name given to the network of interconnected machines. Next to it the communication port currently used by Winjall for communicating is displayed. Actually, several machines can be connected together, for example via the CAN-BUS.

Winjall can then operate several machines at a same time.

The machine is displayed on the machines tree starting from the WinjNet.

The machines tree in the WinjNet network works as an explorer: the branch menu can be expanded or reduced by clicking on the '+' or '-' in front of each branch, or by double-clicking on the name of the branch.

Even when no machine is connected, the network has a minimum of one virtual machine (GENERIC MACHINE) so that the user can work and prepare the data, even when not connected.

With the virtual machine you can also transfer data from one Tuneware to another (cf. later, using the copy-paste function)



When no Tuneware is open on a machine, the expansion of the machines tree shows a menu of three branches options:

- the name of the machine (given by the machine),
- the state of the machine (permanently transmitted by the machine),
- the state of the Tuneware open on the machine ('not defined' if no Tuneware is open)



THE TUNEWARES HOW TO WORK ON A MACHINE

A Tuneware is a file which explains to Winjall the structure of the machine, the data and the software it uses, who is entitled to operate it and at which level (given by access rights).

If you want to tune a machine, you need a corresponding Tuneware.

As long as you have not opened a Tuneware on a machine in the WinjNet machines tree, you can only get access to the basic system functions of the machine but not to the application functions.

Let's give a similar example: when you switch on your PC, it is the operating system that starts working. If you want to work with the PC, you have to launch some application software such as word processing, spreadsheets or calculator.

In the same way, if you don't load any Tuneware when opening Winjall, you can only get access to the system functions and you cannot work on the machine data.

I) OPENING A TUNEWARE:

It is extremely easy but at the same time it can be risky: any mistake could erase all the machine data! So, do follow this procedure very thoroughly.

Open the machine selected tree by double clicking on its name or by clicking on '+'.

Right-click on the State of the Tuneware (second branch displayed under the machine name): a popup menu gives you access to the Tuneware functions. Select 'Open Tuneware'.

You can obtain the same result by directly double-clicking on the tuneware state of the machine.

Winjall will then ask you to select the Tuneware corresponding to the machine. It's up to you to define the type of machine software:

Surf through the directories until you get to the Tuneware matching your machine.

For example, for an engine management ECU, select the ECU type, the load type (turbo, throttle/RPM), if applicable, the sequential gearbox management, the motorised throttle, the Tuneware has to exactly match the configuration of the ECU.

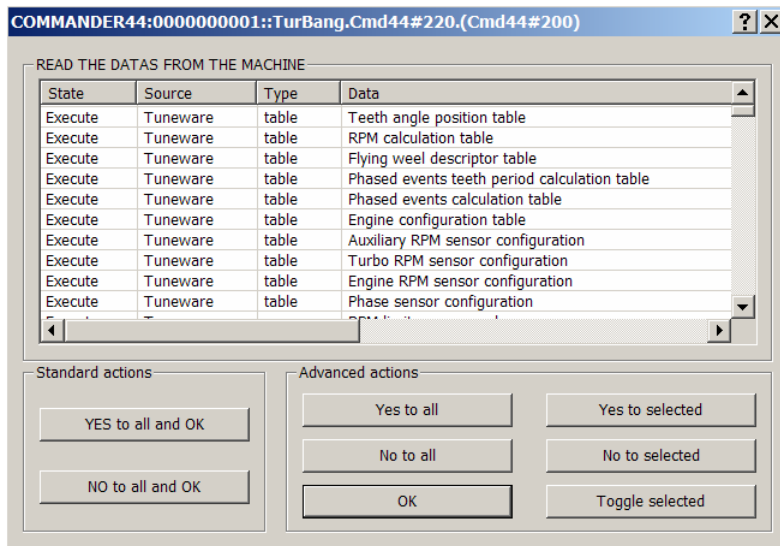
If you choose a Tuneware that does not match the machine or its software, Winjall will send you a warning message and refuse to open that particular Tuneware.

Please note that all the Tunewares can be opened on the "GENERIC MACHINE".

When opening a Tuneware on a real machine (and not on the GENERIC MACHINE), before you have opened it completely, Winjall will ask you a very important question:

"DO YOU WANT TO READ THE MACHINE SETTINGS OR DO YOU WANT TO SEND THOSE PRESENT IN THE TUNEWARE TO THE MACHINE?"

If you tell Winjall not to read the machine settings, it will send the machine the settings to be found in the Tuneware you open on the PC. **The settings that used to be in the machine will then be lost**, and finally replaced by those it is going to receive.



So, unless you are really sure of what you are doing, ask Winjall to read the machine data by answering 'Yes to all and OK'.

Two most commonly used standard actions, as well as advanced actions, are permitted with this dialog box:

STANDARD ACTIONS

Yes to all and OK:

Winjall has to read all the data in the machine. Your Tuneware then becomes a complete image of the machine contents: nothing has been modified in the machine.

No to all and OK:

Winjall has to write all the data to the machine. Your machine then becomes a complete image of the Tuneware contents: all previous settings will be lost.

ADVANCED ACTIONS

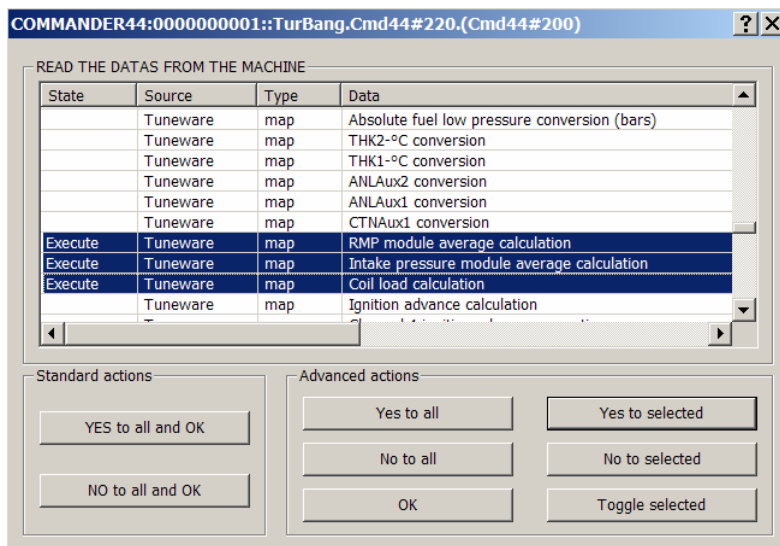
Allow to choose the data to read into the machine and those to write to it.

The list of all the tuning data will be displayed along with the current source of the data (Tuneware), the type of data (table, map or variable) as well as the data name.

A particular data will be read in the machine if it has been validated (execute state). If not, it will be sent to the machine:

Question: "read the data in the machine".

Answer given per data: "Execute" (or not).



OK:

Reads all the validated data in the machine and sends all the data that have not been validated to the machine.

Yes to all:

Validates all the data.

No to all:

Invalidates all the data.

Yes to selection :

If you click on particular data in the list, it turns to blue. You can extend the blue field to other data with [SHIFT][UP] (UP = up arrow), or [SHIFT][DOWN] (down = down arrow).

The data on a blue background are the ones you have selected.

Next use "Yes to selection" to validate the blue background data.

No to selection :

Invalidates the selected data (blue background).

Click on data:

You can also reverse the validation state by double-clicking directly on a particular data.

II) SHUTTING DOWN A TUNEWARE:

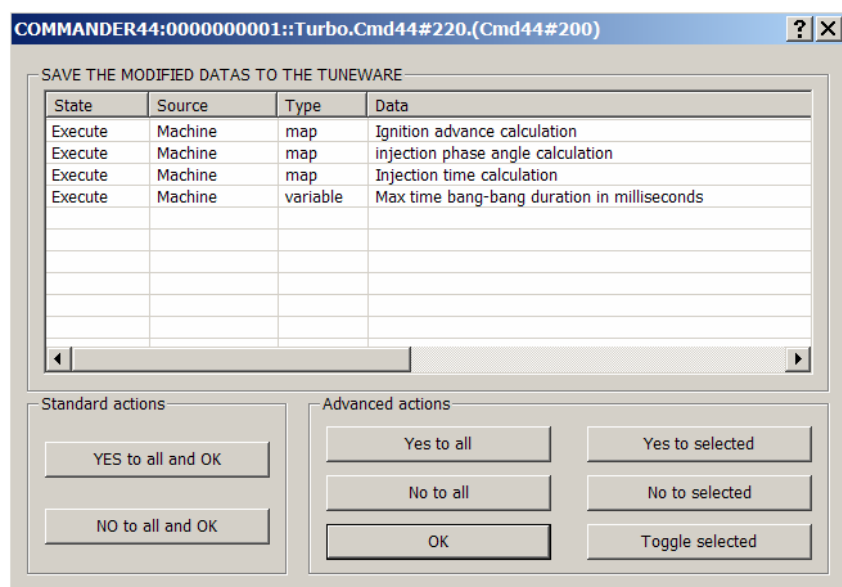
This is very easy, but once again it involves risks that are totally different from opening: a mistake can erase all the data in the Tuneware file you have opened on the machine.

Right-click on the Tuneware State to get the popup menu for access to the Tuneware functions. Select the 'Shut down Tuneware' function.

The same result may be obtained directly by double-clicking on the machine tuneware state that is open.

Winjall will then ask you:

"DO YOU WANT TO SAVE THE TUNING MODIFICATIONS INTO THE TUNEWARE ?"



This question is only about saving the Tuneware on the PC disk: all the data that can have been modified in the machine will remain changed (except in the GENERIC MACHINE but it is just a virtual one).

With this dialog box, two most common standard actions are possible, as well as advanced actions:

STANDARD ACTIONS

Yes to all and OK:

Winjall has to write all the data in the Tuneware. It replaces the original settings of the Tuneware file by new ones.

The previous settings in this particular Tuneware file will then be finally replaced by the ones received from the machine or the ones you have modified by hand.

No to all and OK:

Winjall must not save the data in the Tuneware. All the new settings are then abandoned and not transferred to the Tuneware.

ADVANCED ACTIONS

You can select the data to be saved in the Tuneware and those to be abandoned.

The list of all the setting data is then displayed along with the current modification source of the data ('Edition' if modified by Winjall action or 'Machine' if modified by reception from the machine), the type of data (table, map or variable) as well as the name of the data.

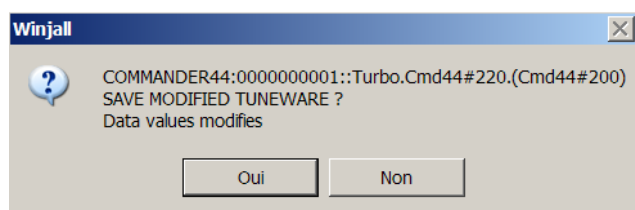
Data are only saved in the Tuneware if validated (execute state). If not, it will be abandoned:

Question: "Save the modified data in the Tuneware".

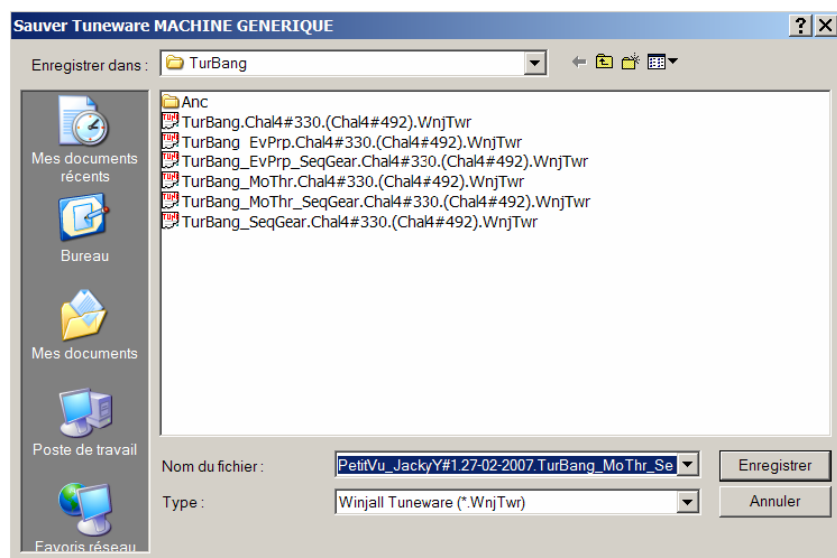
Answer given per data: "Execute" (or not).

It works the same way as opening Tunewares described above.

Winjall then suggests saving the modified Tuneware file with a summary of the new modifications.



If you wish, you can save this new Tuneware under a different name so that you can easily retrieve these settings later and without altering the settings of the original Tuneware.



You'll then have two Tunewares for this type of machine, one with original settings, the other one with the new ones.

III) AUTOMATIC OPENING OF THE TUNEWARES:

When shutting down Winjall without having shut down the Tuneware on your machine(s), Winjall memorizes you have not shut down this or these particular Tuneware(s).
At its next session, as soon as Winjall sees the machines are being connected, it will automatically open the same Tunewares to give the same working configuration as for the last shutting down.

With the automatic reopening, Winjall will not ask the question whether you want to get the data from the ECU or sent them to it - it will systematically recover them so as to be perfectly synchronised with the machine.

Note this function may be disabled or re-enabled with the 'Preference\on machine opening' in the main menu :



IV) READING THE ECU CHARACTERISTICS:

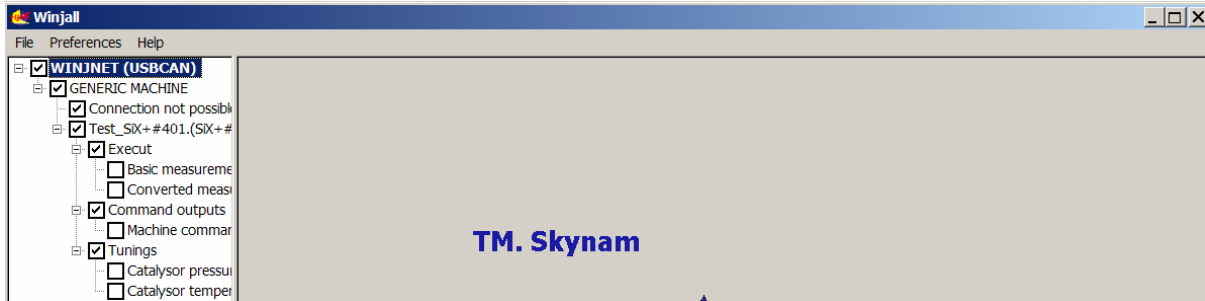
If you do not know exactly what there is in your ECU, the operation function 'ECU CHARACTERISTICS' you can get to from the popup menu with the machine name will help you. This function displays the ECU full name (machine domain), who possesses it (machine possessor) as well as the type of application software it contains.

ECU caracteristics::ECU caracteristics	
COMMANDER44:0000000001::Machine_Menu::ECU caracteristics::ECU caracteristics	
Machine state : Nominal working	
Machine Domain	
SKYNAM: AUTOMOTIVE: RACE: ENGMAN: COMMANDER: COMMANDER44: 0000000001	
Machine Possessor	
SKYNAM	
User applicative	
SKYNAM: AUTOMOTIVE: RACE: ENGMAN: COMMANDER: COMMANDER44: VACUM#220	

This can be useful for choosing the corresponding Tuneware.

APPLICATION FUNCTIONS DISPLAY

When a Tuneware is open on a machine (in this particular case, on the generic machine, the one that is never connected and only virtual), the possible application functions for this machine are displayed in the machines tree under the machine.



You'll then see the name of the open Tuneware instead of the message "Tuneware not defined" on the line of the Tuneware state and, under this state, the machines tree with permitted functions for this particular user (by calculating access rights between the licence, the Tuneware and the machine on which that particular Tuneware has been opened).

I) DISPLAY PAGE OPENING

In the menu for each function, you can find the sub-functions displayed in the right window if they have been selected by the user.

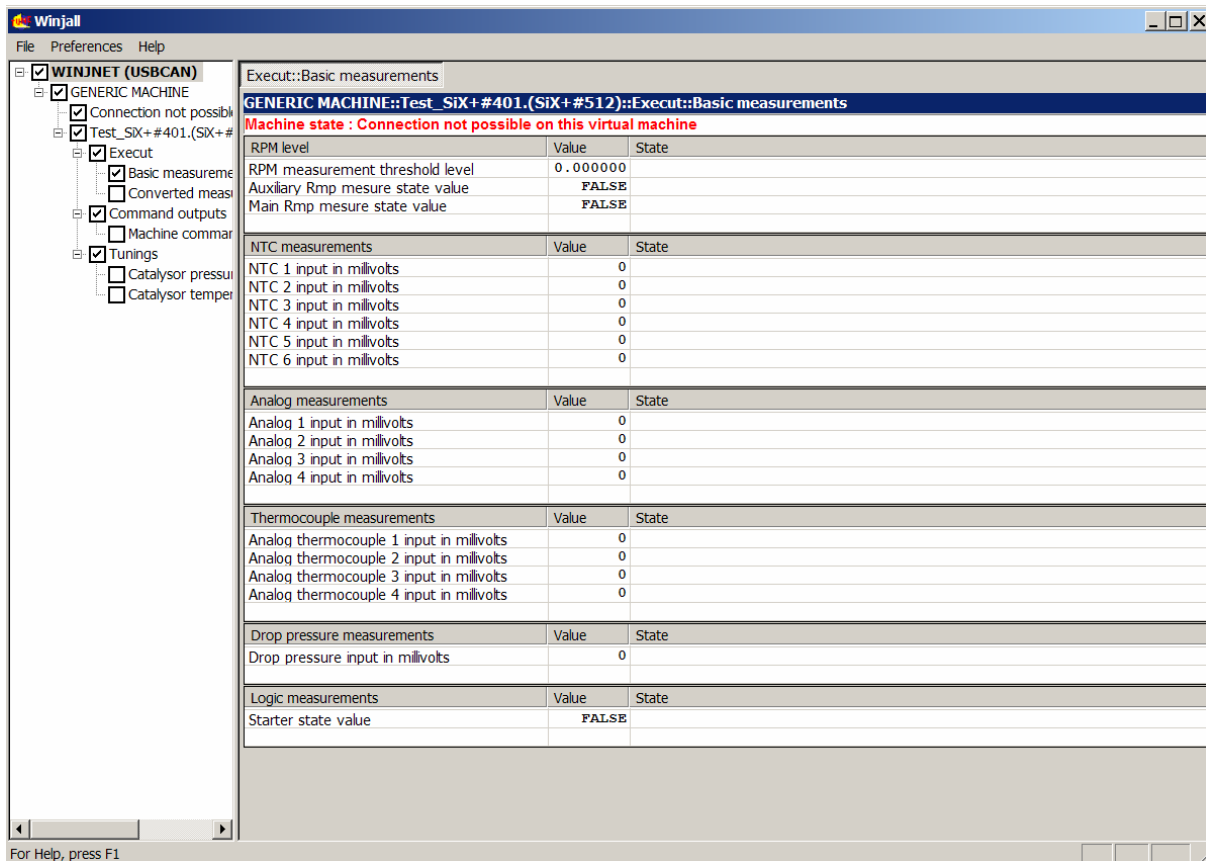
When one of the sub-function fields has been checked in the machines tree and the field for the mother function, the field for the Tuneware and the machine have been checked too, the corresponding application function will appear in the right window.

Actually, you only need to check the whole branch for displaying the application function.

In the example below, the "basic measurements" function has been checked, as well as the mother function "Execute", the state line for the Tuneware 'Test_SiX#370 ...' and the "GENERIC MACHINE".

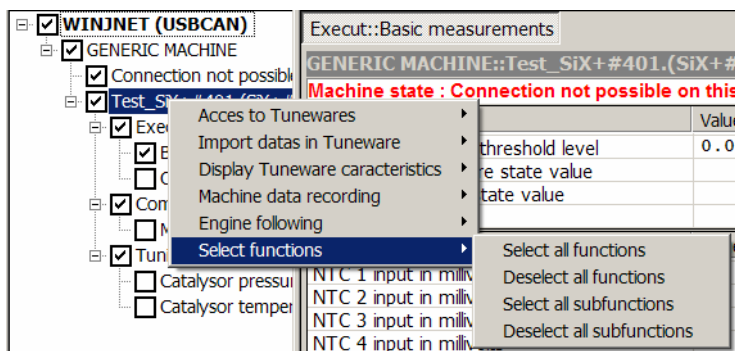
The page for this function 'Execut::Basic measurement' then appears with its tab in the right window, as well as the name of the machine followed by the repetition of the name of the function in the blue (activated) strip of the page and the state of the machine.

Underneath, you can find the data for the required function.



If another application function has been required, it will then be displayed.

If you want to select all the sub-functions of one particular function, right-click on this function and select “select all sub-functions” in the popup menu.



CHANGE DISPLAY PAGES

You can jump from one page to the next one either by clicking on the tab corresponding to the required function in the page, or by double-clicking in the machines tree on the name of the function that is already open, either by using the keyboard and combining [SHIFT][PGDOWN] for moving forwards or [SHIFT][PGUP] for moving backwards in the pages.

You can select as many application functions as you like at a same time, in as many machines (among the 1024 possible machines in the current protocol) connected to WinjNet:

This user's interface gives you the possibility to choose from all the functions of all the machines and select the specific functions you want to work on, next jump from one to the other one by simply clicking on the tabs or pressing [SHIFT][PGUP] | [PGDOWN] on the keyboard.

III) CLOSING DISPLAY PAGES

If you want to unselect a page, you have to uncheck it in the menu or select “close page” by right-clicking on its tab in the popup menu that has appeared.

If you want to de-select all the sub-functions of a particular function, uncheck that particular function in the machines tree.

If you want to de-select all the functions of one particular tuneware or machine, uncheck that particular Tuneware or machine.

MODIFICATIONS TO THE DATA VALUES IN THE PAGES

There are two types of data :

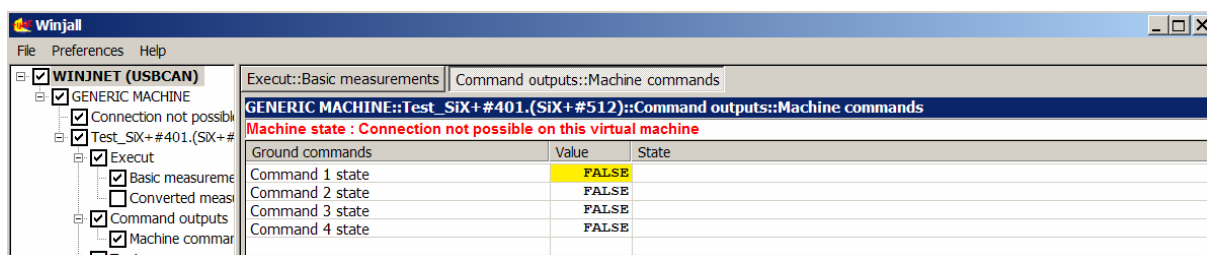
- informative data the user cannot modify
- tune-up data the user can modify

If the user's access rights for a machine are not sufficient, maybe a particular tune-up data won't be displayed, or may be displayed but can't be changed.

Tune-up data the user has full access to can receive the modification cursor so as to be modified.

The modification cursor is represented by the colouring (yellow) of the cell background corresponding to the value of the particular variable.

I) SINGLE VARIABLES



When a particular value has been modified, it appears in italics to remind you it has been changed.

A) CHOOSING THE VARIABLE THAT HAS TO BE MODIFIED

If you want to move the modification cursor to another variable, you either click on the new variable or press [PGUP] or [PGDOWN] on the keypad.

B) CHANGING THE VALUE OF A SINGLE VARIABLE

If you want to modify the value allocated to the data when the cursor is on it, you only have to press [+] or [-] on the keypad or, if you are using a laptop, on the numeric keypad by using [Fn +] [Fn -] for a set modification of a value.

The data will then be increased or decreased by 1.

If you press [SHIFT][+] or [SHIFT][-], the data will be modified by 10.

If you press [CTRL][+] or [CTRL][-], the data will be modified by 100.

If you want to modify the value of the data in percentage when it has the cursor, you only have to press [*] or [/] on the keypad or, if you are using a laptop, [Fn] + [+] or [Fn] + [-] for a set modification of a value.

The data will then be increased or decreased by 0.1%.

If you press [SHIFT][*] or [SHIFT]/], the data will be modified by 1%.

If you press [CTRL][*] or [CTRL]/], the data will be modified by 10%.

II) MAPS:

A map is a set-up unit representing a mathematical function of the $z = f(x, y)$ type. The results are not calculated but read (interpolated) in a table of values.

THK-C° conversion						
LINE SCALE			0-30 V Alimentation tension			0.000
COLUMN SCALE			Channel ADC 09 0-5 volts value			0
	0	1000	2000	3000	4000	5000
14.000	+0	+200	+397	+589	+781	+984
28.000	-6	+193	+386	+571	+758	+956

Consequently, this grid has two scales, the one for 'y' (lines) and the one for 'x' (columns), which are the cells with a dark background. The data (function results) are at the crossing of the lines and columns of the scales in the grid.

In the above example, the input number = 28.000 for the line and 4000 for the column; so the output value = +758.

A) MODIFICATION CURSOR

- 1) Select a set of cells by positioning the cursor with the four arrows of the keypad [UP] [DOWN] [LEFT] [RIGHT] or by using the mouse for clicking on them.
- 2) You stretch the modification cursor to the bottom or the right by press [SHIFT][DOWN] and [SHIFT][RIGHT].
- 3) You shorten the modification cursor to the top or the left by pressing [SHIFT][UP] and [SHIFT][LEFT].

Data cell selection is then reported to the scales with a specific background colour of the corresponding cells:

Below, the +193 field has been selected and the corresponding line scale = 28,000 and column scale=1000 have been given a blue background.

The screenshot shows the Winjall software window. On the left is a tree view with 'WINNET (USBCAN)' expanded, showing 'GENERIC MACHINE' and 'Test_SIX+#401.(SIX+#512)'. The main window displays 'Execut::Basic measurements' and 'Command outputs::Machine commands'. Below this is a table for 'Catalysor temperature' with columns 'Value' and 'State'. The bottom section shows the 'THK-C° conversion' table, which is identical to the one in the first image, but with the '28000' line and '1000' column highlighted in blue, and the '+193' value highlighted in yellow.

The particular background colour of the scale cells corresponds to the selected data cells so that you can easily spot the position of maps with a huge number of lines and columns in the scales.

Two very useful additional functions for handling the modification cursor can be used when setting up in real time. With these two functions you can match the modification cursor to the operation cursor (cf. later).

- 1) Position the modification cursor on the operation cursor (cf. later under 'operation cursor') : by pressing [ENTER], the modification cursor is directly positioned at the place and size of the operation cursor.

+ 8.00	+ 13.00	+ 13.00
+ 8.00	+ 15.00	+ 15.00
+ 8.00	+ 19.00	+ 19.00
+ 8.00	+ 21.00	+ 20.00
+ 8.00	+ 22.00	+ 21.00
+ 0.00	+ 24.00	+ 23.00
- 20.00	+ 27.00	+ 25.00

→

+ 8.00	+ 13.00	+ 13.00
+ 8.00	+ 15.00	+ 15.00
+ 8.00	+ 19.00	+ 19.00
+ 8.00	+ 21.00	+ 20.00
+ 8.00	+ 22.00	+ 21.00
+ 0.00	+ 24.00	+ 23.00
- 20.00	+ 27.00	+ 25.00

- 2) Get the operation cursor to follow the modification cursor: press on [SPACE BAR].

The modification cursor self-positions and keeps following the heaviest (most important) cell of the operation cursor (cf. later under 'operation cursor'). You only need to modify the data without using the arrows anymore.

If you want to recover the positioning command for the modification cursor, either press on one of the four arrows, or on the space bar again, or on the enter key.

B) CELL MODIFICATION UNDER CURSOR

The modification always applies to the whole set of selected cells.

You modify the value of the selected zone like a single variable [SHIFT, CTRL, +, -, *, /]

MAP CALCULATIONS AND OPERATION CURSOR

A map is a mathematical function with pre-calculated results.

Most maps have two input variables and one output value (the function result). So, they are of the $R = f(x,y)$ type.

Some simpler maps only have one input value. So, they are of the $R = f(x)$ type, just like most analogical conversion sensor maps.

I) MAP OPERATION :

An injection time map in an engine management ECU, for example, requires RPM and load input values and outputs an injection time value.

In the injection time map, the lines correspond to the various loads for a particular RPM and the columns correspond to the various RPM for a particular load.

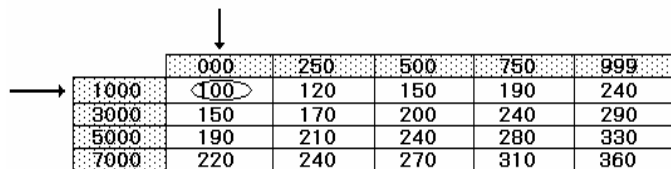
The RPM scale is displayed vertically on the right of the data, one RPM per line and the load scale is displayed horizontally above the data, one load per column.

Injection time values to be used for calculation will be found at the intersection of the RPM lines and the load columns.

The map is divided into three zones.

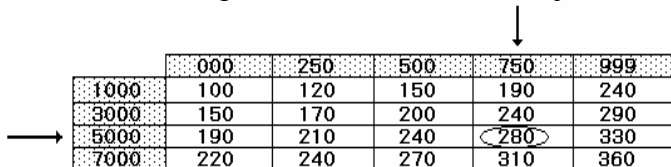
- grey vertical zone : RPM scale
- grey horizontal zone : load scale
- central zone : the values used by the engine management ECU

In the following example, if RPM = 1000 rpm and load = 000, the injection value will be = 100 :



	000	250	500	750	999
1000	100	120	150	190	240
3000	150	170	200	240	290
5000	190	210	240	280	330
7000	220	240	270	310	360

If RPM = 5000 rpm and load = 750, the injection value will be 280 :

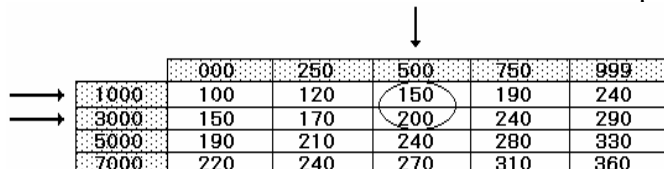


	000	250	500	750	999
1000	100	120	150	190	240
3000	150	170	200	240	290
5000	190	210	240	280	330
7000	220	240	270	310	360

II) MAP LINEAR INTERPOLATION:

IF the RPM or load does not correspond exactly to one of the corresponding scale value, the ECU will do a linear interpolation (kind of weighted average) for calculating the final value:

IF RPM = 2000 rpm and load = 500, the value will be $175 = (150+200)/2$, which is the RPM intermediate load value between 1000 and 3000 rpm:



	000	250	500	750	999
1000	100	120	150	190	240
3000	150	170	200	240	290
5000	190	210	240	280	330
7000	220	240	270	310	360

If RPM = 1000 rpm and load = 125, the value will be $110 = (100+120)/2$, which is the intermediate load value between 000 and 250 :

		000	250	500	750	999
→	1000	100	120	150	190	240
	3000	150	170	200	240	290
	5000	190	210	240	280	330
	7000	220	240	270	310	360

If RPM = 2000 rpm and load = 125, you will need four cells for calculating the final value, as RPM will be between 1000 and 3000 rpm and load between 000 and 250 : the final value will be $[(100+120)/2 + (150+170)/2] / 2 = 135$

		000	250	500	750	999
→	1000	100	120	150	190	240
→	3000	150	170	200	240	290
	5000	190	210	240	280	330
	7000	220	240	270	310	360

For perfectionists, the actual calculation is even slightly more complex: if RPM = 1503 rpm and load = 250, the value will be $[170-120]/(3000-1000) \times (1503-1000) + 120 = 132,575$

In case of linear interpolation, if the ECU does not find a scale value, RPM or load value, it will use the two load values and/or the two RPM values surrounding the value you are looking for:

It will either use
 1 cell
 or 2 cells (vertically or horizontally)
 or 4 cells

III) OPERATION CURSOR :

In the Winjall display, the cells used are called 'Operation cursors' and their values are displayed in red. The operation cursor is shown in real time (changes when input values change).

Injection time calculation												
LINE SCALE			RPM measurement (RPM)					2426	Standard interpolation			
COLUMN SCALE			Intake pressure (bars)					1.154	Standard interpolation			
Inj.°	0.000	0.350	0.550	0.750	0.950	1.050	1.100	1.300	1.600	2.000	2.500	
600	6.85	6.85	10.77	17.53	23.16	25.93	27.26	32.60	40.43	52.24	65.94	
800	10.12	10.12	15.92	24.92	32.21	35.89	37.61	44.51	55.40	71.27	89.96	
1300	18.64	18.64	29.31	44.32	56.14	62.08	64.95	76.45	94.94	121.29	152.86	
1700	25.45	25.45	40.02	60.46	75.64	83.19	87.00	102.32	126.15	160.01	201.79	
2100	33.41	33.41	52.51	77.76	96.26	105.69	110.40	129.37	158.10	198.65	250.29	
2500	65.52	41.67	65.52	94.83	117.51	128.79	134.61	157.95	193.02	242.07	305.10	
3000	117.64	53.38	83.91	117.64	144.61	158.47	165.56	194.04	236.91	297.00	374.36	
3600	149.26	70.28	110.51	149.26	179.93	197.43	205.76	239.16	291.69	365.27	459.83	
4200	185.78	87.39	137.34	185.78	223.28	244.90	252.71	284.21	343.29	428.57	539.81	
4800	216.86	102.58	161.28	216.86	259.48	284.42	293.29	329.06	394.67	491.27	619.02	
5400	247.27	117.48	184.68	247.27	294.97	323.29	333.26	373.38	446.28	553.65	697.77	
6200	279.90	132.73	208.62	279.90	334.66	365.98	377.14	422.16	503.33	622.82	784.58	
7000	313.33	147.84	232.35	313.33	375.07	410.27	422.79	473.11	562.66	694.54	874.39	

III) TYPES OF MAP CALCULATIONS :

We have explained about general calculation of linear interpolation, but several types are available for ECUs (to be described later):

- Standard interpolation (stops at scale limits)
- Prolonged interpolation (extrapolation off scale limits)
- Truncated input (no interpolation)

- Increased input (no interpolation)
- Hysteresis input (no interpolation)

With Winjall you can choose the way the ECU calculates on each map with its popup menu 'Map specific editing'.

This is an advanced function that can be extremely important in some cases, i.e. when programming pilot modules and user's programming functions to be found on some very advanced ECUs.

Right-click on the name of the map to be edited for access, select the function 'Map Specific Editing' in the popup menu.

Ignition advance calculation									
LINE SCALE				0		Standard interpolation			
COLUMN SCALE				0.000		Standard interpolation			
	0.000	0.350		0.950	1.050	1.100	1.300	1.600	2.000
600	+ 8.00	+ 13.00		+ 15.00	+ 15.00	+ 15.00	+ 15.00	+ 14.00	+ 14.00
800	+ 8.00	+ 15.00		+ 16.00	+ 17.00	+ 17.00	+ 17.00	+ 19.00	+ 18.00
1300	+ 8.00	+ 19.00		+ 20.00	+ 21.00	+ 21.00	+ 22.00	+ 24.00	+ 21.00
1700	+ 8.00	+ 21.00		+ 22.00	+ 24.00	+ 24.00	+ 25.00	+ 25.00	+ 22.00
2100	+ 12.00	+ 23.00		+ 25.00	+ 25.00	+ 25.00	+ 26.00	+ 26.00	+ 23.00
2500	+ 16.00	+ 25.00		+ 26.00	+ 26.00	+ 26.00	+ 27.00	+ 27.00	+ 23.00

The first dialog box that will appear can be used for adding or suppressing lines in the map.

GENERIC MACHINE

Ignition advance calculation

Ignition angle advance calculation in crankshaft degrees

LINE SCALE	RPM measurement	Standard interpolation
COLUMN SCALE	Intake pressure (bars)	Standard interpolation

	0.000	0.350	0.550	0.750	0.950	1.050	1.100	1.300
600	+ 8.00	+ 13.00	+ 13.00	+ 13.00	+ 15.00	+ 15.00	+ 15.00	+ 15.00
800	+ 8.00	+ 15.00	+ 15.00	+ 15.00	+ 16.00	+ 17.00	+ 17.00	+ 17.00
1300	+ 8.00	+ 19.00	+ 19.00	+ 19.00	+ 20.00	+ 21.00	+ 21.00	+ 21.00
1700	+ 8.00	+ 21.00	+ 21.00	+ 20.00	+ 22.00	+ 24.00	+ 24.00	+ 25.00
2100	+ 12.00	+ 23.00	+ 22.00	+ 21.00	+ 25.00	+ 25.00	+ 25.00	+ 26.00
2500	+ 16.00	+ 25.00	+ 24.00	+ 23.00	+ 26.00	+ 26.00	+ 26.00	+ 27.00
3000	+ 20.00	+ 27.00	+ 27.00	+ 25.00	+ 26.00	+ 26.00	+ 26.00	+ 27.00
3600	+ 24.00	+ 29.00	+ 29.00	+ 26.00	+ 26.00	+ 26.00	+ 26.00	+ 27.00
4200	+ 28.00	+ 31.00	+ 30.00	+ 27.00	+ 27.00	+ 27.00	+ 27.00	+ 28.00
4800	+ 28.00	+ 31.00	+ 30.00	+ 27.00	+ 27.00	+ 27.00	+ 27.00	+ 27.00
5400	+ 28.00	+ 30.00	+ 29.00	+ 26.00	+ 26.00	+ 26.00	+ 26.00	+ 26.00
6200	+ 28.00	+ 29.00	+ 28.00	+ 26.00	+ 26.00	+ 26.00	+ 26.00	+ 26.00
7000	+ 28.00	+ 29.00	+ 28.00	+ 26.00	+ 26.00	+ 26.00	+ 26.00	+ 26.00

Validate

Cancel

Insert before

Insert after

Suppress

Interpol

ECU interpolation type

Selection of ECU interpolation method for this map

Click on [ECU INTERPOLATION TYPE].

COMMANDER44:0000000001

Engine water temperature conversion (°C)

☐ Hysteresis input on line and columns (no interpolation)

VERTICAL SCALE (lines)

☒ Standard interpolation (stops à scale boundaries)

☐ Prolonged interpolation (extrapolation out of scale boundaries)

☐ Truncated input (no interpolation)

☐ Increased input (no interpolation)

HORIZONTAL SCALE (columns)

☒ Standard interpolation (stops à scale boundaries)

☐ Prolonged interpolation (extrapolation out of scale boundaries)

☐ Truncated input (no interpolation)

☐ Increased input (no interpolation)

OK Cancel

For each axis of the map, you can choose the type of interpolation calculation, except for hysteresis maps, for which the calculation is the same on both axis.

A) STANDARD INTERPOLATION

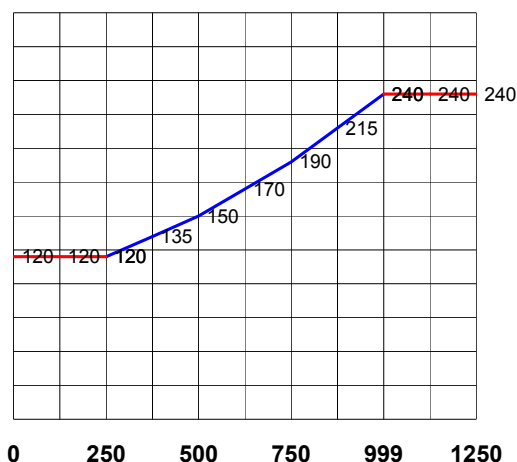
Two types of interpolation are possible, the only difference being the calculation that has been done when the input value of a particular is bigger than the biggest scale value, or smaller than the smallest one : in the example below, if the horizontal input value is less than 250 or greater than 999.

	250	500	750	999
1000	120	150	190	240
3000	170	200	240	290
5000	210	240	280	330

Standard interpolation stops at the scale limits:

For example, for line 1000 if the column input value is less than 250, the output value will remain 120, and if the column input value is greater than 999, the output value will remain 240.

Here is line 1000 in cross-section, the blue line being the output values within the scales and the red line being the data off scales.



Idem for interpolation on the lines: for example, let's take column 250 – if the line input value is less than 1000, the output value will remain 120 and if the line input value is greater 5000, the output value will remain 210.

B) PROLONGED INTERPOLATION

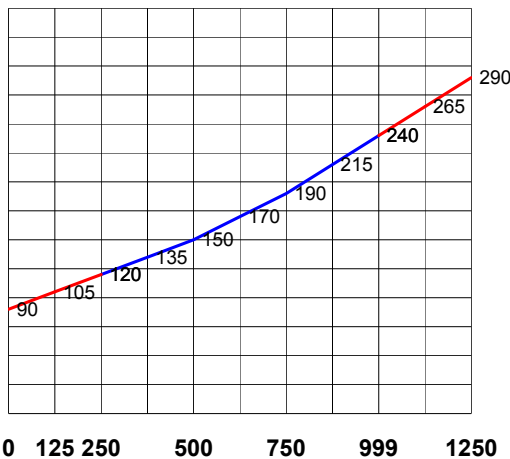
In the same example

	250	500	750	999
1000	120	150	190	240
3000	170	200	240	290
5000	210	240	280	330

The prolonged interpolation keeps following the slope given by the two last values at the overpass side:

For example, for line 1000 – if the column input value = 125 (< 250), the output value will be lower than 120 :

$$120 - [(150-120)/(500-250) \times (250-125)] = 105.$$

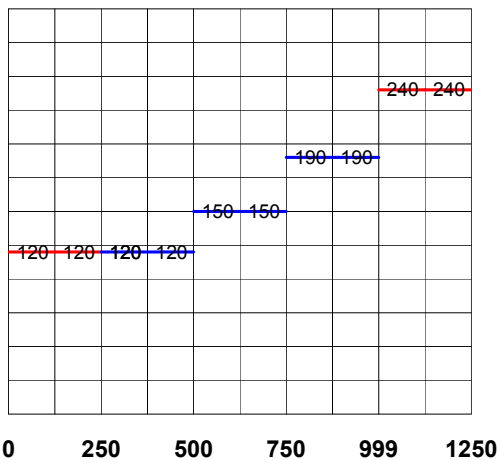


Idem for interpolation on lines : for example, for column 250 - if the line input value = 6000 (> 5000), the output value will be higher than 210:

$$210 + [(210-170)/(5000-3000) \times (6000-5000)] = 230.$$

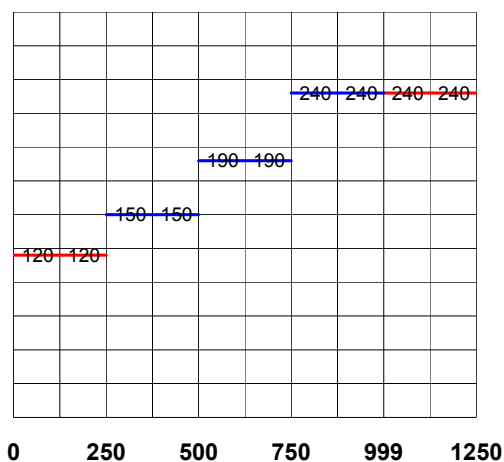
C) TRUNCATED INPUT

There is no interpolation calculation but the input value is put down to the lower scale point giving a pattern of steps towards the bottom between the scale values.



D) INCREASED INPUT

There is no interpolation calculation but the input value is put up to the upper scale point giving a pattern of steps towards the top between the scale values.



E) HYSTERESIS

This is a very special operating mode.

An hysteresis map is a map with states : no interpolation is done.

It is made of lines and columns couples, each couple denifing the transition from a state to another. Between two couples, the state has to stay stable.

It is then only allowed to change state on transition couples. Out of the couples, the state has to be stable.

The transition of the state (output value) is done on input value thresholds: the state only changes when the upper threshold is reached at input increasing and when the lower threshold is reached at input decreasing.

	0
2950	OFF
3000	ON

Imagine this map controls a relay depending on RPM.

Suppose you want the relay to set in above 3000 rpm and to be released below.

a) If you let the ECU interpolate, increase or decrease, this is what would happen:

Up to 2975 rotations, the relay would remain released.

At about 2975 rpm, as RPM is never very stable, the relay would that do a quick succession of engaging and releasing, until RPM gets above 3000 rpm.

In a similar way, with RPM going down, the relay does a succession of engaging and releasing at about 2975 rpm until RPM gets below 2950 rpm.

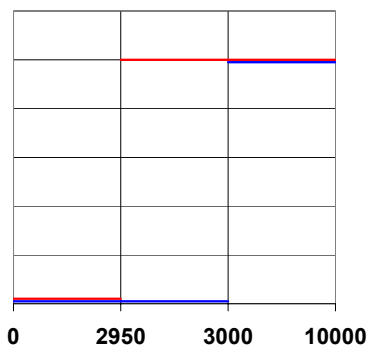
b) If the hysteresis mode is set :

The relay remains released up to 3000 rpm.

When getting to 3000 rpm, the relay engages without any oscillation.

In a similar way, with RPM going down, the relay remains set in until RPM gets below 2950 rpm.

In blue, relay behaviour with RPM going up; in red, relay behaviour with RPM going down.



IV) HOW TO BUILD A HYSTERESIS MAP:

With some advanced functions you can fully define the type and size of map as well as the input variables (such as pilot modules functions, auxiliary commands, additional commands, etc. of Commander ECUs).

SIMPLE CASE OF A SINGLE ACTIVE SCALE WITH ONLY ONE CHANGE OF STATE

Suppose you wish the hysteresis operation mode on a single value with only one ON-OFF transition.

1) You have to create a map with 2 lines and 1 column.

	0

2) On the first scale line, you position the value lines below which the device has to come back to the starting condition, for example 80° engine temperature and, as a corresponding value, the starting state with fan OFF.

	0
80	OFF

3) On the second scale line, you position the value lines from which the device has to change state, for example 85° engine temperature and, as a corresponding value, the active state (opposed to the starting state) with fan ON.

	0
80	OFF
85	ON

For another use, you might wish to start with an ON state and go over to OFF in active state by swapping ON and OFF in the map data.

	0
80	ON
85	OFF

CASE OF A SINGLE ACTIVE SCALE WITH TWO CHANGES OF STATE

Suppose you wish the hysteresis operation mode on one single value with two changes of state, for example a camshaft relay starting from OFF to tick over (1200 rpm), then goes over to ON up to 6000 rpm then OFF again above, with 50 rpm hysteresis at the first change and 100 rpm at the second one.

You have to build a map with 2 changes, with 2 lines for each change (one hysteresis per change, i.e. 4 lines).

	0
1150	OFF
1200	ON
5900	ON
6000	OFF

With RPM going up, starting from 0 rpm, the state remains OFF up to 1200 rpm, then goes over to ON.

The state remains on ON until it gets to 6000 rpm where it goes back to OFF.

With RPM going down, the state remains OFF up to 5900 rpm, then goes over to ON.

The state remains on ON until it gets to 1150 rpm where it goes back to OFF.

CASE WITH TWO ACTIVE SCALES AND ONLY ONE CHANGE OF STATE

Suppose you wish the hysteresis operation mode on two input values and only one change of state.

For example: switch on a lamp if the oil pressure drops down to below 1500 millibars, but only if RPM is above 1000 rpm.

You have to build a map with a line scale representing the RPM and where the column scale stands for the oil pressure.

This map will have two lines and two columns for the two values changes with hysteresis : one for the oil at 1 500 bars and the other one for RPM at 1 000 rpm.

	1.450	1.500
1150	OFF	OFF
1200	ON	OFF

Let's have a closer look:

- Below 1150 rpm, the state is always OFF, whatever the oil pressure.
- Above 1200 rpm and with pressure below 1.500 bars, the state moves to ON.
- In this particular RPM zone, if the pressure goes above 1.500 bars, the state moves to OFF; if the pressure goes back down below 1.450 bars, the state moves back to ON.
- In this ON state, if RPM goes back to below 1150 rpm, the state moves back to OFF.

GENERAL CASE

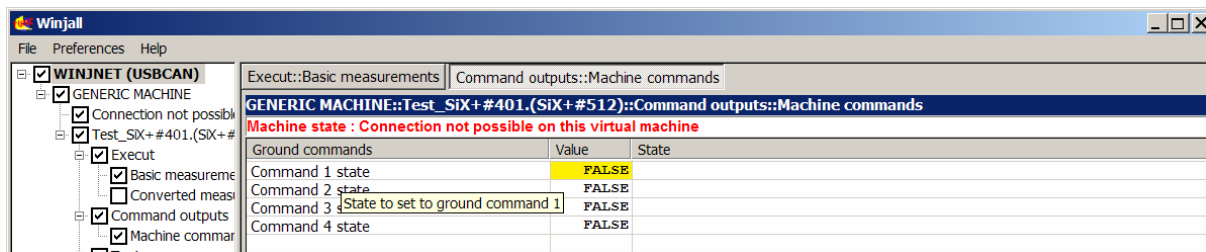
We have only used in these examples ON-OFF states, but all state values can be used in hysteresis maps.

For example, for a common rail diesel engine, where the number of injection for each engine cycle can change following (for example) the load and RPM. The hysteresis calculation is so used to select the number of injections to avoid an oscillation of the injection sequence while injection number changes.

COMMENTS ON THE DATA

I) COMMENT DISPLAY :

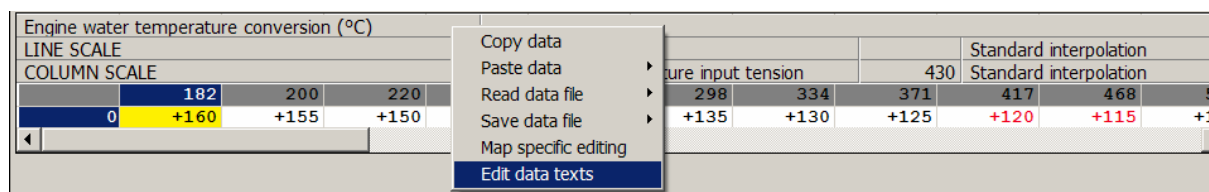
If the mouse cursor stays on a particular data, a tool tip appears about this data. It tells you how the machine is using the particular data.



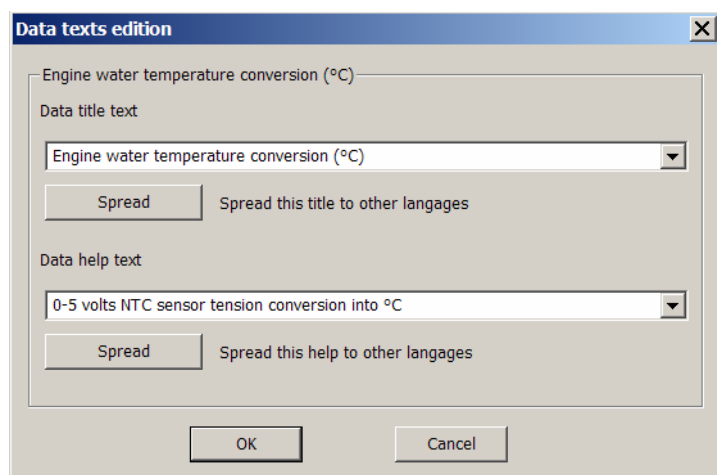
II) HOW TO MODIFY THE COMMENT :

You can modify the comment with the “edit data text” function. This is true for comments about a variable, a table or a map.

You have to use the popup menu that appears if you right-click on the name of the data

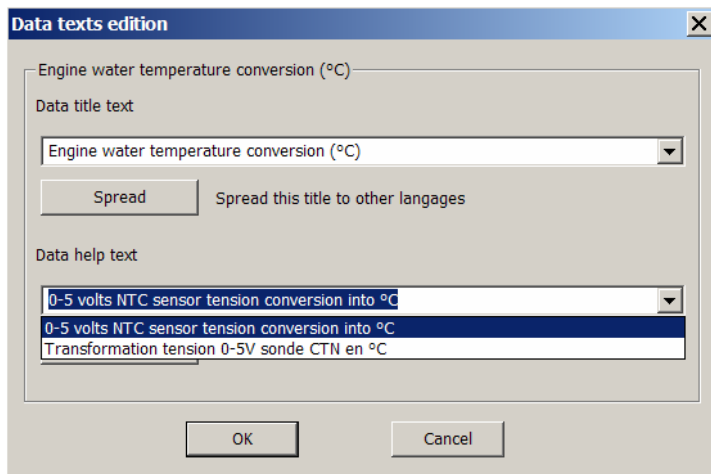


The dialog box that then turns up helps you edit the data texts.



Except for very special cases, it is not recommended to modify the heading (the name of the data) but modifying its help text can be extremely useful for writing down the modifications to the data. For example, in the case of a sensor conversion table, you may want to keep the reference for this particular sensor.

The Tunewares are multilingual, so you can modify the texts in one or more languages, which may reveal extremely handy if your Tuneware can be distributed on PCs that do not understand English. If you want to see or modify the other languages, use the arrow in the right corner of the edit box.



If you press on “spread”, the displayed text will be copied in all the languages.

These texts are saved in the Tuneware Register. When the user shuts down the Tuneware, Winjall asks you if you want to save this Tuneware as it has been modified.

READ-SAVE DATA FILE

With a right click on the name of the variable, you can read the popup menu and get to the 'Read data file' and 'Save data file' functions.

Ignition advance calculation									
LINE SCALE									
COLUMN SCALE									
	0.000	0.5							
600	+ 8.00	+ 13.							
800	+ 8.00	+ 15.							
1300	+ 8.00	+ 19.							
1700	+ 8.00	+ 21.							
2100	+ 8.00	+ 22.							

With these functions you can save a map or a table on the disc and read it again, whereas Tuneware reads or saves all the data together in the Tuneware file.

These reading saving functions are mainly used to get to the sensor conversion maps and the standard tune-up maps supplied with Winjall.

Indeed: when you launch the ECU, you have to adjust it to the configuration of the engine or the device where it has to be installed.

If this engine or device has sensors, such as temperature or pressure sensors, you have to tell it the exact ECU type of these sensors. You then have to display the conversion map of the sensor and use the 'Read data file' function to give it the required value (and the comment).

I) READ DATA FILE:

Engine water temperature conversion (°C)									
LINE SCALE									
COLUMN SCALE									
	182	200							
0	+160	+155							

The 'Read data file' function has two sub-functions :

1) With comment insertion : with the value, the name of the file you are reading will be directly inserted as a map comment (example : Bosch_0280130026.TempCtn)

Engine water temperature conversion (°C)									
LINE SCALE									
COLUMN SCALE									
	182	200	220	242	268	298	334	371	417
0	+160	+155	+150	+145	+140	+135	+130	+125	+120

This is very handy if you want to remember which type of sensor the engine Tuneware is fitted with.

2) Without comment insertion : only the value will be used.

II) SAVE DATA FILE:

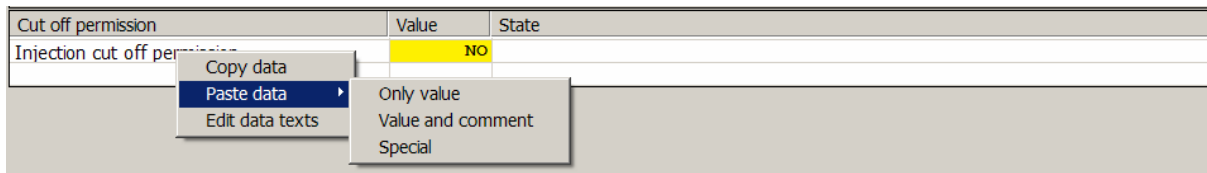
Engine water temperature conversion (°C)									
LINE SCALE									
COLUMN SCALE									
	182	200							
0	+160	+155							

The 'Save data file' function has two sub-functions :

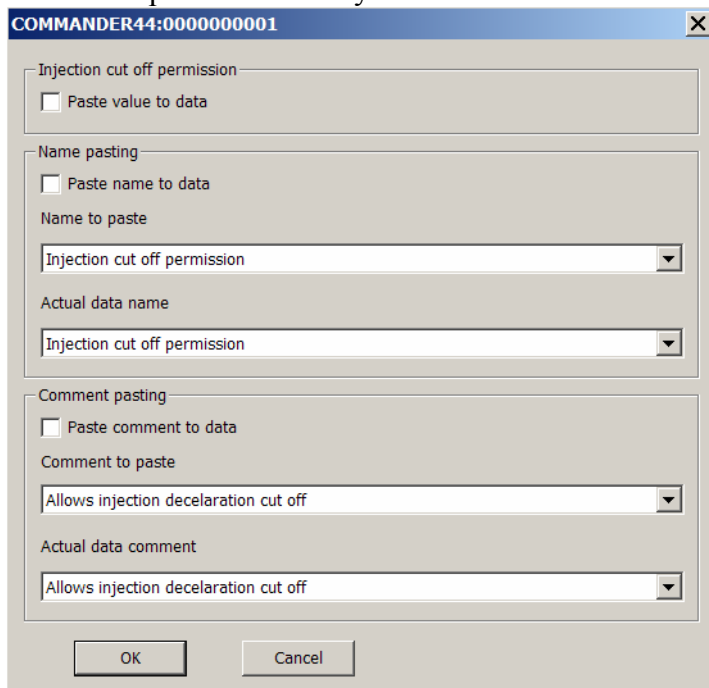
- 1) With comment insertion : When you give the name under which the file has to be saved on the disc, this file name will be directly inserted as map comment.
- 2) Without comment insertion: the value will be simply saved.

COPY-PASTE DATA

With a right click on the name of a variable, the popup appears so that you can get to the 'Copy data' and 'Paste data' functions.



The 'Copy data' function copies the value, the name and the comment (help) of a data. With the 'Paste data' function you can paste either the value, or the value together with the comment. With the 'Special' function you can choose what has to be pasted: the value, title and/or the comment.



The pasting of the value can only be carried out on a variable of the same type : you cannot paste the value of a variable to a map.

HOW TO USE IT

Open a Tuneware on the generic machine in which you want to take a tune-up to put it on an ECU (for example, a map).

Display the page with the data to be copied, copy the data with a right click on 'Copy data'.

Display the page where the data has to be pasted, and paste it with a right-click function 'Paste data'.

INJALL IMPORTER MAP

With the ECU DOS versions, a lot of users could tune up engines. It is not possible to use the DOS settings directly in Winjall. A particular function can recover the previous settings in Winjall.

Ignition advance calculation										
LINE SCALE			Injail map import		nt (RPM)		2427	Standard interpolation		
COLUMN SCALE			Copy data		bars)		1.154	Standard interpolation		
	0.000	0.000	Paste data	0.500	1.050	1.100	1.300	1.600	2.000	2.500
600	+ 8.00	+ 15.00	Read data file	0.00	+ 15.00	+ 15.00	+ 15.00	+ 14.00	+ 14.00	+ 12.00
800	+ 8.00	+ 15.00	Save data file	0.00	+ 17.00	+ 17.00	+ 17.00	+ 19.00	+ 18.00	+ 15.00
1300	+ 8.00	+ 19.00	Map specific editing	0.00	+ 21.00	+ 21.00	+ 22.00	+ 24.00	+ 21.00	+ 18.00
1700	+ 8.00	+ 21.00	Edit data texts	0.00	+ 24.00	+ 24.00	+ 25.00	+ 25.00	+ 22.00	+ 19.00
2100	+ 8.00	+ 22.00		0.00	+ 25.00	+ 25.00	+ 26.00	+ 26.00	+ 23.00	+ 21.00

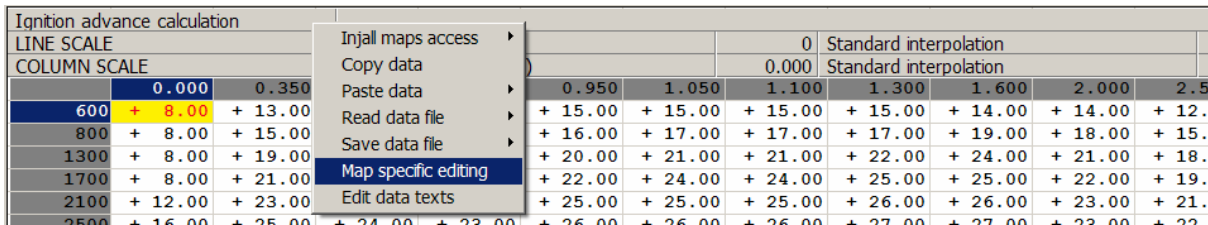
If you want to do that, you have to right-click on the name of the map for which you want to import some DOS setting, choose the « Injall map import » in the popup menu and navigate through the directories until you find the map to be recovered. Select the name of that map: the conversion takes place automatically.

MAP SPECIFIC EDITING

You quite often need to modify the number of lines or columns of a map.

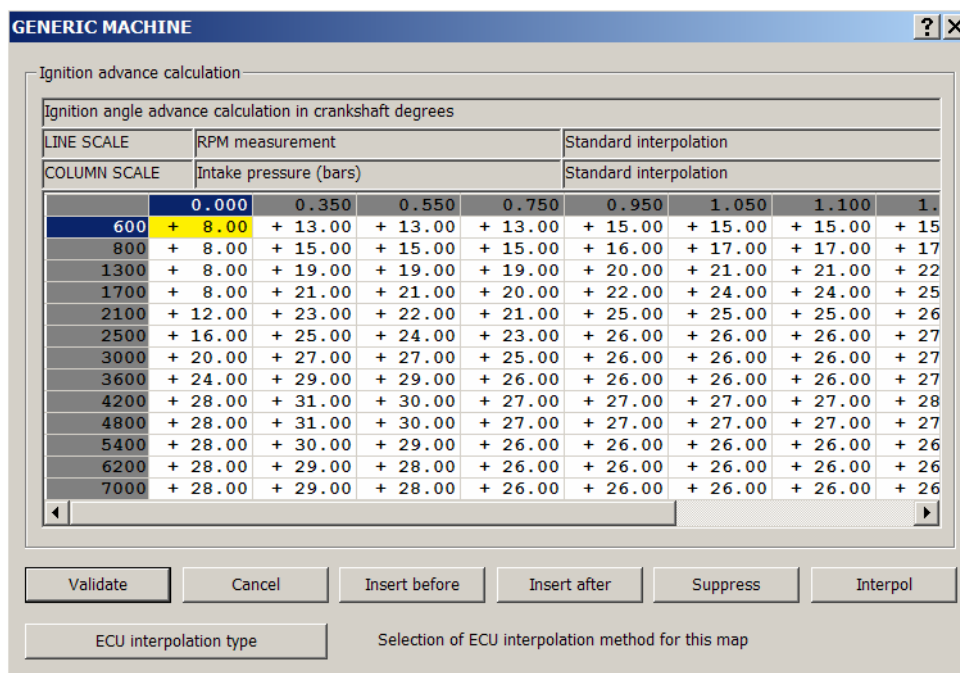
- Winjall has a specific function to do it.

Right-click on the name of the map to be edited, select the 'Map specific editing' function in the popup menu.



The screenshot shows a context menu with the following options: Injall maps access, Copy data, Paste data, Read data file, Save data file, Map specific editing (highlighted), and Edit data texts. The background table displays ignition advance values for various RPM and pressure points.

LINE SCALE	0.000	0.350							
COLUMN SCALE	0.000	0.350	0.950	1.050	1.100	1.300	1.600	2.000	2.5
600	+ 8.00	+ 13.00	+ 15.00	+ 15.00	+ 15.00	+ 15.00	+ 14.00	+ 14.00	+ 12.00
800	+ 8.00	+ 15.00	+ 16.00	+ 17.00	+ 17.00	+ 17.00	+ 19.00	+ 18.00	+ 15.00
1300	+ 8.00	+ 19.00	+ 20.00	+ 21.00	+ 21.00	+ 22.00	+ 24.00	+ 21.00	+ 18.00
1700	+ 8.00	+ 21.00	+ 22.00	+ 24.00	+ 24.00	+ 25.00	+ 25.00	+ 22.00	+ 19.00
2100	+ 12.00	+ 23.00	+ 25.00	+ 25.00	+ 25.00	+ 26.00	+ 26.00	+ 23.00	+ 21.00
2500	+ 16.00	+ 25.00	+ 26.00	+ 26.00	+ 26.00	+ 27.00	+ 27.00	+ 23.00	+ 22.00



The 'GENERIC MACHINE' dialog box is open, showing the 'Map specific editing' window. It contains a table of ignition advance values for various RPM and pressure points. The table has columns for RPM measurement and intake pressure (bars), and rows for different RPM values. The table is titled 'Ignition angle advance calculation in crankshaft degrees'.

LINE SCALE	RPM measurement	Standard interpolation
COLUMN SCALE	Intake pressure (bars)	Standard interpolation
600	+ 8.00	+ 13.00
800	+ 8.00	+ 15.00
1300	+ 8.00	+ 19.00
1700	+ 8.00	+ 21.00
2100	+ 12.00	+ 23.00
2500	+ 16.00	+ 25.00
3000	+ 20.00	+ 27.00
3600	+ 24.00	+ 29.00
4200	+ 28.00	+ 31.00
4800	+ 28.00	+ 31.00
5400	+ 28.00	+ 30.00
6200	+ 28.00	+ 29.00
7000	+ 28.00	+ 29.00

Buttons: Validate, Cancel, Insert before, Insert after, Suppress, Interpol.

ECU interpolation type: Selection of ECU interpolation method for this map

I) ADDING AND SUPPRESSING LINES :

If you want to add or suppress a line, you have to position the modification cursor (yellow) with the keypad arrows or the mouse on the heading of the line or column you want to add or suppress, then press one of the 'Insert' or 'Suppress' button.

II) INTERPOLATING:

If you are adding a line or a column, you can fill it automatically by Winjall via the [Interpol] function: position the modification cursor (yellow) with the keypad arrows or the mouse on the header or the line or column to be filled in.

This will fill it with transparent values for calculation: the line or column does not affect the tuning. This is a good way for starting with a new line or column.

Note that if you set the cursor on the first or last line or column, Winjall extrapolates its value by keeping the slopes found with the two next values.

III) EXITING:

Finally, if you want to exit this function, select [Validate] to save the new map, or [Cancel] to give it up and go back to the previous settings.

MAP RE-INITIALIZING

If, in the normal mode, the modification cursor is positioned on a modified map and you want to return to a basic value, press [ESC] or [ECHAP] : Winjall will then asks you if you want to come back to the initial settings.

Ignition advance calculation			RPM measurement (RPM)				2427	Standard interpolation			
LINE SCALE			Intake pressure (bars)				1.154	Standard interpolation			
COLUMN SCALE			0.750	0.950	1.050	1.100	1.300	1.600	2.000	2.500	
	0.000	0.550									
600	+ 8.00	+ 13.00	+ 13.00	+ 15.00	+ 15.00	+ 15.00	+ 15.00	+ 14.00	+ 14.00	+ 12.00	
800	+ 8.00	+ 15.00	+ 15.00	+ 16.00	+ 17.00	+ 17.00	+ 17.00	+ 19.00	+ 18.00	+ 15.00	
1300	+ 8.00	+ 19.00						+ 22.00	+ 24.00	+ 21.00	
1700	+ 8.00	+ 21.00						+ 25.00	+ 25.00	+ 22.00	
2100	+ 8.00	+ 22.00						+ 26.00	+ 26.00	+ 23.00	
2500	+ 0.00	+ 24.00						+ 27.00	+ 27.00	+ 23.00	
3000	- 20.00	+ 27.00						+ 27.00	+ 27.00	+ 23.00	
3600	- 20.00	+ 29.00						+ 27.00	+ 27.00	+ 23.00	
4200	- 20.00	+ 30.00						+ 28.00	+ 28.00	+ 24.00	
4800	- 20.00	+ 30.00						+ 27.00	+ 27.00	+ 23.00	
5400	- 20.00	+ 29.00	+ 26.00	+ 26.00	+ 26.00	+ 26.00	+ 26.00	+ 26.00	+ 26.00	+ 23.00	
6200	- 20.00	+ 28.00	+ 26.00	+ 26.00	+ 26.00	+ 26.00	+ 26.00	+ 26.00	+ 26.00	+ 23.00	
7000	- 20.00	+ 28.00	+ 26.00	+ 26.00	+ 26.00	+ 26.00	+ 26.00	+ 26.00	+ 26.00	+ 23.00	

Be careful: you'll then lose all the modifications!

FILTERING OF VARIABLE DISPLAY

Informative variables are sent by the ECU. Their values can change at any moment. The user may want to 'pacify' the display for some values (for example, unstable engine RPM). You have to use a function called up by a popup menu appearing when right-clicking on the variable :

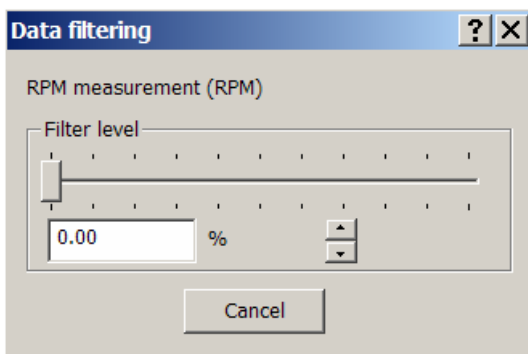
Advance ignition angle	Value	State
RPM measurement (RPM)	2427	
Intake pressure (bars)		
Final ignition advance		

Tune the filter on this data

Stop datas filtering

Edit data texts

This display filtering function permits you to choose the filtering percentage from 0 to 100%. The filtering is an averaging ranging from 0 (no averaging, 0%) and 10 seconds (maximum averaging, 100%).



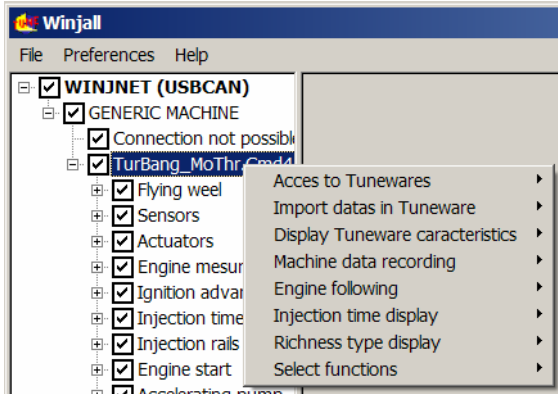
You can choose the percentage for a particular data with the cursor, the arrows or by writing the value directly.

When you have selected a level of averaging, it is then saved in the Tuneware Register. When the user asks the Tuneware to shut down, Winjall will say the Tuneware has been modified and ask if this has to be saved, so that the users can save their display options.

ATTENTION: This filtering involves the display only. It does not filter the value that is actually used in the ECU.

TUNEWARE FUNCTIONS

Right-click on the State of the Tuneware (in the machines tree, for each machine, on the State of the Tuneware); with the popup menu, you can get to the Tuneware functions. The standard Tuneware functions are the following :



I) OPENING THE TUNEWARE :

Here you can load a Tuneware on the machine, which will give Winjall a description of the application functions corresponding to this machine. So it can calculate the user's actual access rights on the machine.

Winjall starts from the basic directory of the machine data for the window where you select the Tuneware (see later 'Preference functions').

You can also open a Tuneware directly by double-clicking on the state of the Tuneware.

For more details, look at the section at the beginning of the manual 'the Tunewares, or how to work on a machine'.

II) CLOSING A TUNEWARE :

If some variable values have been modified, Winjall asks the user if they should be saved in the Tuneware.

If the Tuneware has been modified (variable values modified, variable filtering modified, comments modified, ...) Winjall asks the user if he wants to save the Tuneware and, if so, under which name.

You can also close a Tuneware directly by double-clicking on the state of the Tuneware.

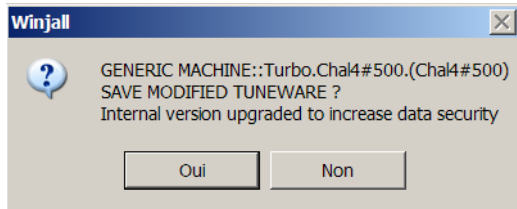
For detailed explanations, see the sections at the beginning of the manual 'The Tunewares, or how to work on a machine'.

WARNING

Since V2.00 Winjall version, internal structure of the Tunewares has been modified to increase data security and confidentiality.

Each time an old structure Tuneware is closed, Winjall offers you to save this Tuneware with the new internal structure. For security increasing, it is better to accept the saving.

No data relative to the ECU is modified by this structure modification.



If nothing else has been modified in the Tuneware (nor data, nor texts, ...), you can save this tuneware without changing its name.

To avoid asking you, each time you close an old structure Tuneware, to save this Tuneware in the new structure version, Winjall will search and automatically modify all the old structure Tunewares.

You can also use the function '**Security update of Tunewares structure**', detail just later in this documentation.

III) SAVING TUNEWARE :

For saving the Tuneware while it is being used, Winjall asks the user under which name and in which directory it has to be saved.

This function works like the "Close Tuneware" function. It offers the selection of data to be saved in the Tuneware.

IV) SECURITY UPDATE OF TUNEWARES STRUCTURE :

Since V2.00 Winjall version, internal structure of the Tunewares has been modified to increase data security and confidentiality.

Each time you close an old structure Tuneware, Winjall rebuilds it with the new version structure and offers you to save it under the new form.

No data relative to the ECU is modified by this structure modification.

To avoid Winjall to ask you, each time you close an old structure Tuneware, to save this Tuneware in the new structure version, you can use the function '**Security update of Tunewares structure**' found from 'Access Tuneware' menu context, only on the GENERIC MACHINE.



Winjall preselects the standard Tuneware access path on you hard drive.

If you have stocked Tunewares on another path of you hard drive, select the root directory of this other path.

All the old structure Tunewares in the selected path will be converted to the new structure and saved under the same names. The Tunewares already built with the new structure will not be modified by this operation.

Do again this operation for all the specific paths (if there is any) where you have placed your own Tunewares.

It is not needed to do the operation on Tunewares directly provided by Skynam because they are already built with the new structure, including the ones in the Archives directories, which are now old Tuneware versions but provided with the new structure.

V) PROTECT A SPECIFIC TUNEWARE:

A specific Tuneware is a Tuneware in which access rights are increased to get to special settings. Using this Tuneware is restricted to one single Winjall licence, the tuner's one, who Skynam specially supplied with the Tuneware. No other user may open this particular Tuneware.

The specific Tuneware protection consists in the creation of a Tuneware that can only be used on a single machine. To do this, Winjall will add the machine serial number to the general domain of the selected specific Tuneware.

This protected specific Tuneware can then be used to make a distant upgrade of the selected machine, and only this one.

See function 'Distant upgrade of the clients ECUs'.

VI) ADDING SPECIFIC TUNEWARES:

A specific Tuneware is a Tuneware in which access rights are increased to get to special settings. Using this Tuneware is restricted to one single Winjall licence, the tuner's one, who Skynam specially supplied with the Tuneware. No other user may open this particular Tuneware.

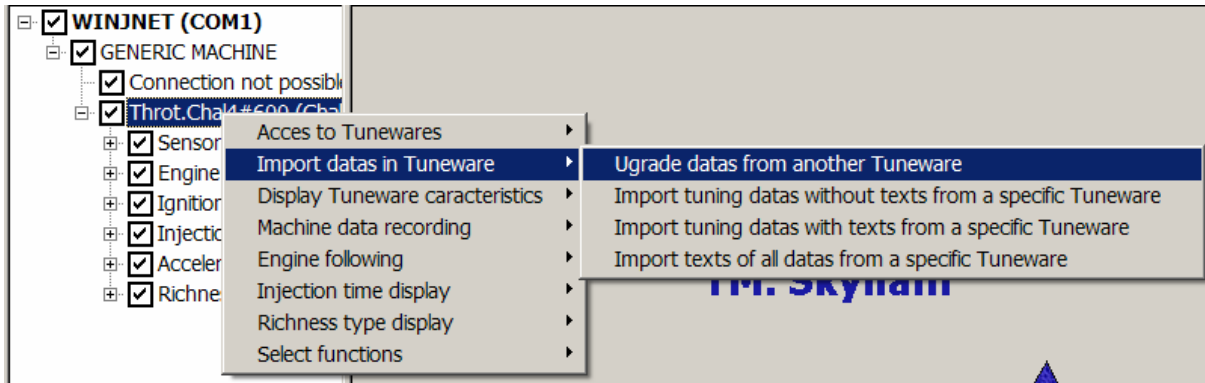
When Skynam provides new Tunewares as an update of the machines software, the motorist that have got a specific licence receive a file containing the pack of corresponding specific Tunewares. This function allows extracting the specific Tunewares from the received pack file.

VII) DATA UPGRADE BY ANOTHER TUNEWARE:

When a Tuneware is open on the 'GENERIC MACHINE' (always off connection), the upgrade gives you the possibility to import the data of a former Tuneware version into this particular one, for example when Skynam supplies a new software version for an ECU.

When upgrading, you can – in just one single operation – **copy the values and the texts** for the application data (variables, maps, tables ...) of the Tuneware taken from the disc and you can paste all the corresponding ones to the open Tuneware, even if you don't normally have access to these data.

All the data in the (open) target Tuneware destination corresponding to data in the source Tuneware (disc) are automatically replaced.



Once this operation is over, you have to save the opened Tuneware on the disc.

Next, inject this new Tuneware into the ECU to be upgraded with the 'MACHINE UPGRADE' function.

Before the machine upgrade, the data that are hidden in the machine are not changed and it is not certain it will work.

HOW TO USE THIS FUNCTION

This function is only available if the target Tuneware is open in the 'GENERIC MACHINE' (always off connection) and only if the source Tuneware (the disc Tuneware which you want to take the data from) is a Tuneware giving you at least standard access rights:

This means that you absolutely cannot get data from a Tuneware that you can't normally open with the function 'Open Tuneware', as for example a named specific Tuneware with 'Professional tuning' access right specially protected by a named professional licence with its dongle.

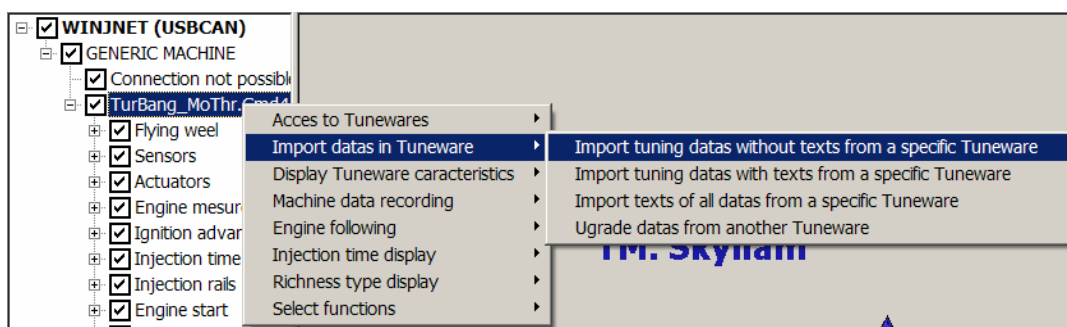
VIII) IMPORTING SPECIFIC TUNEWARE DATA:

A specific Tuneware is a Tuneware in which access rights are increased to get to special settings.

Using this Tuneware is restricted to one single Winjall licence, the tuner's one, who Skynam specially supplied with the Tuneware. No other user may open this particular Tuneware.

When a Tuneware is opened on the 'GENERIC MACHINE', data importation from a specific Tuneware taken on the disc to the opened Tuneware allows to copy a selected part or all of the application data (variables, maps, tables, etc.) of this specific Tuneware in one single operation and to paste all the ones that correspond into the opened Tuneware.

The data of the target Tuneware (open) for which you have an access right are replaced by the corresponding data of the source Tuneware (disc).



This function can work in three different ways:

1) Import the tuning data without importing the texts :

Only the tuning data values (i.e. the tuning values, tables, variables and maps) will be imported. The values of the informative data (for example, engine RPM) won't be used.

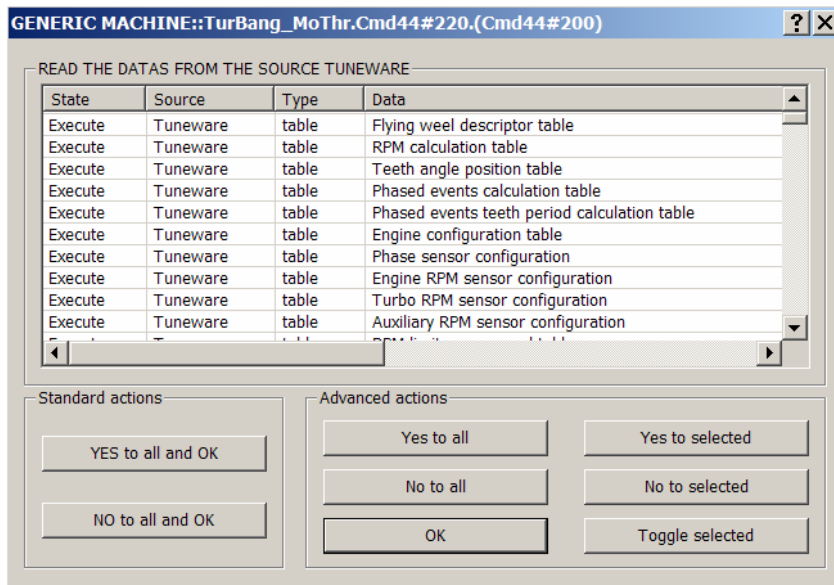
2) Import tuning data and import texts :

The values of the tuning data and their texts (name and comments) will be imported.

3) Import the texts of all the values:

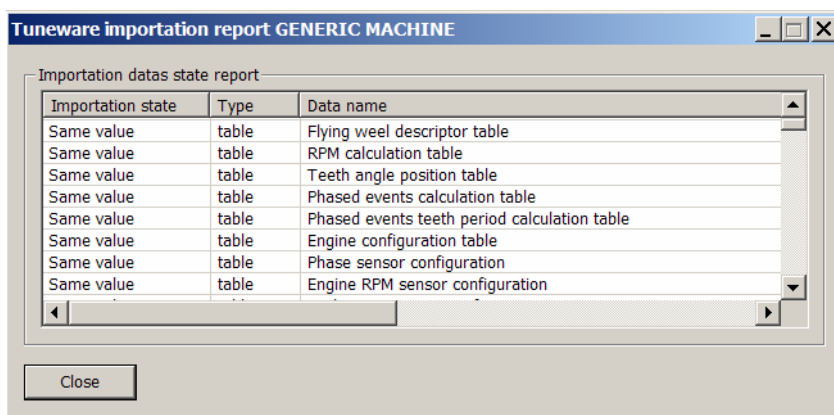
The texts (names and comments) of all the data, both for tuning and information, will be imported but no value will. With this function, if you have changed the name of a tuning or information variable (for example, changed "Engine RPM" into "Number of rotations per minute of the engine"), or its comments, these texts will be imported.

When you execute this function, Winjall starts by showing the list of the data that can be imported:



Winjall, just like for the opening of a Tuneware (see detailed explanations in the chapter at the beginning of the manual 'The Tunewares, or how to work on a machine'), allows you to select the data to be imported.

At the end of the importation, Winjall displays a report with the list of the data it has replaced so you can check what has been executed.



The importation state for each data helps you understand what has been done about that particular data.

Refused by the user: the data was not validated for importation in the selection phase of the data to be imported.

Identical values: the values in source and in the target Tuneware were the same.

No correspondence: the target Tuneware data had no correspondence in the source Tuneware.

Non-copyable: this data must not be copied.

Imported: importation has been completed.

Note: in the 'Importing tuning data with texts' function, the state of importation is given for the value. If the value was the same but the texts had changed, the texts have been imported but the importation has not been mentioned.

USING OF THIS FUNCTION

This function is only available if the target Tuneware is open in the 'GENERIC MACHINE', and if the source Tuneware (the disc Tuneware from which you can take the data) is a specific one giving at least 'TUNER' access rights.

This function is mainly used for a data selective copy from a disc Tuneware to an opened Tuneware. It is also used to compare two Tunewares one from each other: indeed, at the end of the importation, Winjall displays an importation report detailed for each data, showing if it is different or identical in the two Tunewares.

It is also used when a tuner has carried out very specific settings on a machine for which he has special access rights thanks to a specific Tuneware. In this case, he can transport the settings to a standard Tuneware with normal access rights.

The customer who has asked the tuner to carry out these settings can be given a standard Tuneware containing these specific settings. He can then use it as a backup.

For example: if the machine breaks down, he can go on if he has another one.

However, the customer can only see the standard settings he can get to according to his normal access rights.

For more details, see below 'Distant upgrade for clients ECUs'.

IX) DISPLAYING OPEN TUNEWARE CHARACTERISTICS:

This gives the characteristics of the access rights for the Tuneware that is being used (recorded in the Tuneware Register):

- Version # of internal structure: 1 pour old structure, 2 for security upgraded new structure.
- Domain
- Owner
- ID hardware
- ID system
- ID firmware
- ID group
- ID software

X) DISPLAYING DISC TUNEWARE CHARACTERISTICS:

This gives the characteristics of the access rights for a Tuneware elected on a disc (recorded in the Tuneware Register). See "Displaying open Tuneware characteristics".

XI) SELECTING ALL THE FUNCTIONS AND SUB-FUNCTIONS :

For the selection of all the functions and sub-functions of this Tuneware in the machines tree: all the pages will be displayed.

XII) DESELECTING ALL THE FUNCTIONS AND SUB-FUNCTIONS :

For deselecting all the functions and sub-functions of this Tuneware in the machines tree: all the pages will be deselected.

XIII) TYPE OF INJECTION TIME DISPLAY:

For the engine managements ECUs monitoring the injection, injection times may be displayed either in time or in camshaft degrees (very useful if you need to know if the injectors are being saturated: I.T. above 720° on a 4-stroke or above 360° for a 2-stroke).

In this Tuneware menu, Winjall gives you the possibility to select the type of display you wish. This choice will be valid for all the maps and injection time measurements of that particular machine. You will also find a popup menu for selecting the I.T. display by right-clicking on the injection maps data cells.

XIV) TYPE OF RICHNESS DISPLAY:

For the engine management ECUs measuring combustion richness, richness can be displayed either in air/fuel ratio (Lambda), or in fuel/air ratio (richness).

In this Tuneware menu, Winjall gives you the possibility to choose the display type you wish. This choice will be valid for all the maps and richness measurements for that particular machine.

You will also find a popup menu for selecting the richness display type by right-clicking on the richness control maps data cells.

XV) ENGINE FOLLOW-UP

You can ask for, or stop the follow-up of the operation cursor by the modification cursor on all the ECU maps.

DISTANT UPGRADE OF CLIENTS ECUS

For the motorists owning a specific licence with its dongle, and specific Tunewares (named), a new procedure for distant upgrade of clients ECU is to be used with this new Winjall Version:

I) THE MOTORIST HAS TAKEN POSSESSION OF THE MACHINE:

If you have taken possession of the machine, your client can not modify the tuning by himself.

If it is needed to change the tunings, you can modify them in the specific Tuneware (named) corresponding to its engine, and send him this modified Tuneware.

Notice that the client has to have installed the Winjall v3.00 or later version on his computer.

Although he can not open this Tuneware to look at the tunings it contains, he can all the same use it to upgrade his ECU with the function 'UGRADE MACHINE'.

IMPORTANT:

If you send your specific Tuneware to a client, all the clients owning a machine of the same type (example Challenger4) on which you have taken possession can also upgrade their ECU with this Tuneware, if the client give them this Tuneware.

To avoid this situation, you can first use the function 'SPECIFIC TUNEWARE PROTECTION' on the Tuneware that you want to send, which will limit the use of the Tuneware to le only one machine of this client.

A) MOTORIST PROCEDURE:

- 1) Having installed Winjall V3.00 or later
- 2) Having taken possession of the machine
- 3) Create or modify a specific Tuneware with the client engine tunings, if possible with a securized version (example Challenger4 V6.00)
- 4) If this Tuneware must not go anywhere else that on only one ECU, use the function 'Tuneware protect' on this Tuneware.
- 5) Send the (protected) Tuneware to the client.

B) CLIENT PROCEDURE:

- 1) Having installed Winjall V3.00 or later
- 2) Set the specific motorist's Tuneware into his computer with the other Tunewares.
- 3) Execute the function 'Machine upgrade' on his ECU with this Tuneware.

II) THE MOTORIST HAS NOT TAKEN POSSESSION OF THE MACHINE:

The machine is opened, so your client can access data for which he has access rights.

If the tuner gives the customer a copy of the specific Tuneware he has used for carrying out the tuning (it contains all the settings) straightaway, the customer will not be able to use this specific Tuneware for working or reloading his ECU, because he has no access rights to this Tuneware.

So, the motorist has to import on a standard Tuneware the data of his specific Tuneware, and give this standard Tuneware to his customer.

IMPORTANT:

If you send a standard Tuneware to a client, all the clients can look at the tunings and upgrade their corresponding machine with this Tuneware.

To avoid this situation, you have to use the first method by taking possession of the machine.

A) MOTORIST PROCEDURE:

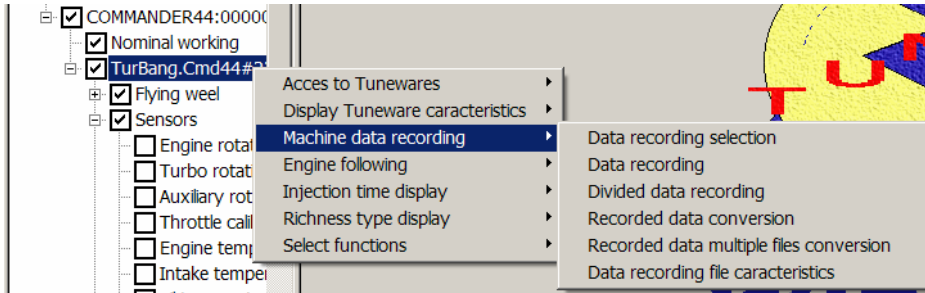
- 1) Having installed Winjall V3.00 or later
- 2) Not having taken possession of the machine
- 3) Import data from his specific Tuneware to a standard Tuneware with the function 'Import data from a specific Tuneware'. If possible use a securized version of standard Tuneware (example Challenger4 V6.00)
- 4) Send to the client the standard Tuneware containing the tunings.

B) CLIENT PROCEDURE:

- 1) Having installed Winjall V3.00 or later
- 2) Set the standard motorist's received Tuneware into his computer with the other Tunewares.
- 3) Execute the function 'Machine upgrade' on his ECU with this Tuneware to set all the data into his ECU. A simple connection with the ECU would send to the ECU only the part of data on which the customer has access rights.
- 4) Later, a standard connection with the ECU can be used, because all the hidden data has already been sent to the ECU.

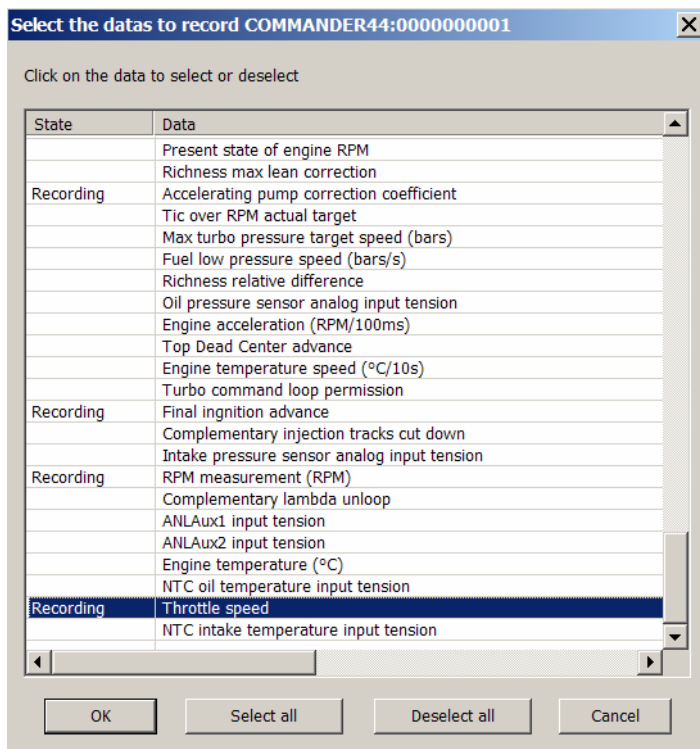
DATA RECORDING FUNCTIONS ON THE DISC

Right-click on the state of the Tuneware (in the machines tree, for each machine, on the state of the Tuneware) to get the popup menu to get access to the data recording functions of the Tuneware. The data recording functions for the standard tuneware are the following:



I) CHOOSING THE DATA TO BE RECORDED:

Gives the list of recordable data of the Tuneware that is open for this particular machine.



Double clicking on a data reverses the selection for this particular data: if it didn't need to be recorded, now, it does, and vice-versa.

When recording of the required data has been positioned, click on [OK].

For quitting the function without saving the modifications, click on [Cancel]

For selecting the recording of all the data, click on [Select all]

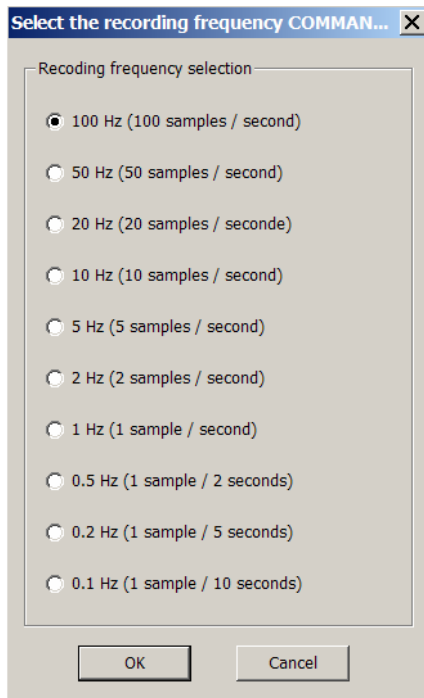
For deselecting the recording of all the data, click on [Deselect all]

The state of request for recording the data being memorised in the Tuneware Register, any change of data to be recorded will automatically offer to save the Tuneware when shutting it down.

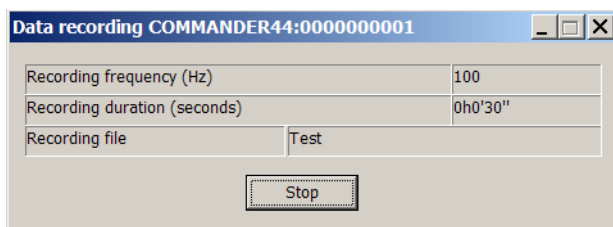
II) DATA RECORDING :

When launching the recording of the data for this particular Tuneware; the data will be recorded on a disc file.

A dialog box appears to allow you to select the recording frequency.



The file selection dialog box in which the data will be saved is open.
Next, when recording has been launched, an information dialog box is open.



This box reminds you of the selected recording frequency, gives the recording durations since the beginning in hours, minutes and seconds and reminds you in which particular file the data are being recorded.

You can use the minimization system button for putting this dialog box as an icon in the toolbar.

Press the STOP button to complete recording: Winjall then offers to save the recording in a disc file with 'WnjRda' a file name extension.

III) SPLIT DATA RECORDING :

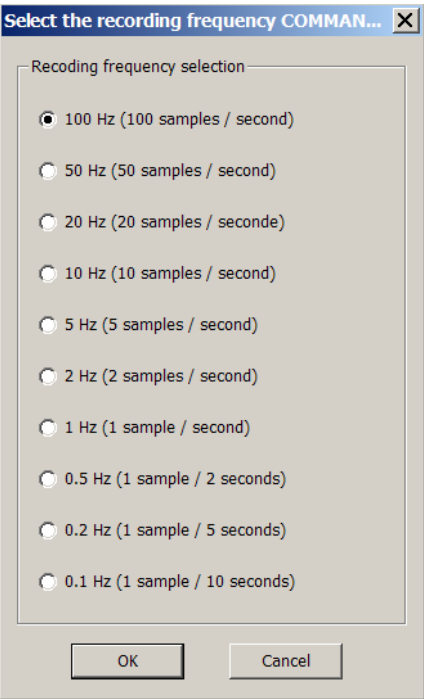
When launching data recoding for the particular Tuneware: the data will be recorded in several successive files; each of them being the data recording for a selected duration.

The user has to choose a generic file name; the name of each recorded file will be followed by the file subscript:

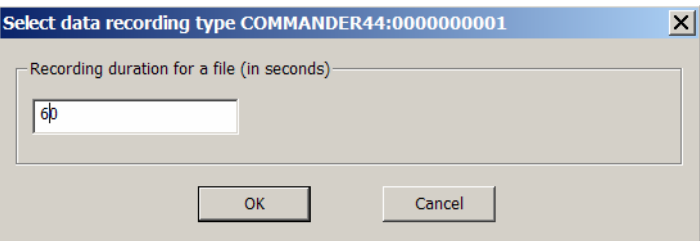
generic file: TEST.WnjRda

1st recorded file: TEST.000.WnjRda
2nd recorded file: TEST.001.WnjRda
3rd recorded file: TEST.002.WnjRda
4th recorded file: TEST.003.WnjRda
etc.

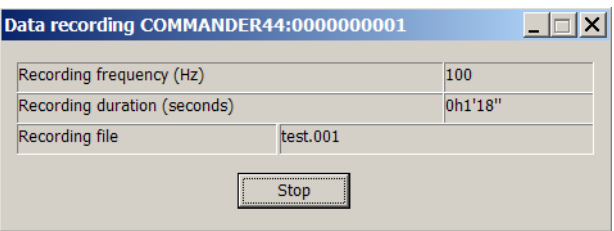
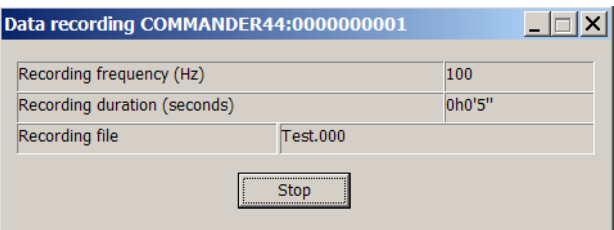
A dialog box appears for you to choose the recording frequency.



Another dialog box appears for you to choose the recording duration in seconds for each of the files:



The dialog box for choosing the file in which the data will be recorded is opened.
Once recording has been launched, an information dialog box appears.



This box reminds you of the selected recording frequency, displays the time that has lapsed since the beginning of the recording in hours, minutes and seconds and reminds you in which file (with subscript) the data are currently being recorded.

With the minimization system button you can put this dialog box as an icon in the toolbar.

Press the STOP button to complete the recording: Winjall then offers to save the recording in a disc file, with 'WnjRda' as file name extension.

IV) CONVERT RECORDED DATA :

The data file recorded on a disc is saved in binary format.

If you want to use it, it has to be converted: with this function, Winjall converts the 'WnjRda' binary file into a '.CSV' file that can be used in a spreadsheet (such as Microsoft Excel) or any other text editor.

Note : the conversion of non-integer numeric values (for example power voltage with three decimals for millivolts) uses the dot to separate the integer part from the decimals: with some spreadsheet versions, you may have to convert these decimal dot into another decimal character.

V) CONVERTING MULTIPLE FILES :

You can select a recording file source directory in binary format and convert all the files it contains into '.CVS' to a second selected directory.

VI) DISPLAYING DISC DATA RECORDING FILE CHARACTERISTICS :

Gives the characteristics of a binary data file that have been recorded on a disc:

- Machine domain on which the recording has been done
- Machine possessor on which the recording has been done
- Machine application software on which the recording has been done
- Recording frequency

STATE FUNCTIONS

Right-click on the state of the machine (in the machine machines tree; for each machine on the state of the machine) to display the popup menu to get to the state functions. The standard state functions are the following:

I) MACHINE CALENDAR MANAGEMENT :

You get access to the machine calendar (if the machine has got one), date and time, with some sub-functions:

- See time and date
- Update time and date

II) DIAGNOSTIC MANAGEMENT :

You get to the machine function diagnostic along with some sub-functions

A) ERASE SYSTEM BREAKDOWNS

The system breakdowns appear in the state of the system. These are:

- Reset watch dog error (simple, repeated, past): the machines are fitted with a watch dog re-launching the machine in case of an unrecoverable error. When this problem occurs, it is noted and announced as system error.
- +30 absent error : the machines are fitted with permanent power supply along with power supply after switching on. If the permanent power supply disappears, the problem is noted and announced as system error.
- Other breakdowns specific to the machines.

B) ERASING FUNCTIONAL BREAKDOWN/FAILURE

Functional breakdowns are the ones spotted by the application software, for example 'RPM error', 'intake pressure error', etc. With this function you can reset all such errors.
Next display the diagnostic.

C) DISPLAYING FUNCTIONAL BREAKDOWNS

You can scan through all the functional breakdowns suffered since the last erase.

Machine function diagnostic	Value	State
Diagnostic machine function	GENERAL	
Breakdowns diagnostic		
Application data general diagnostic		
Some functions have memorized errors		
Some functions are at the moment invalid		

On the last page you'll find a summary of all the breakdowns diagnosed.

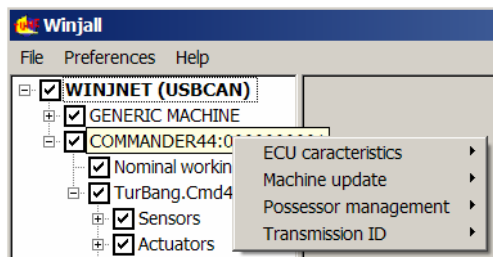
Next you can scan through the application functions one by one by using the [+] for moving forward and the [-] for moving backward.

Example :

Machine function diagnostic	Value	State
Diagnostic machine function	DIAG 002	
Breakdowns diagnostic		
Intake pressure (bars)		
Intermittent blackout		
Present functionment valid		

SYSTEM FUNCTIONS

Right-click on the name of the machine (in the machines tree; for each machine, on the name of the machine) to display a popup menu to get to the system functions. The standard system functions are the following :



D) ECU CHARACTERISTICS:

displays all the characteristics of the machine and the software that has been implanted :

- its full qualified name (with serial number)
- its possessor (person who owns the machine)
- the type of software it contains (type of application and version number)
- the system binary versions, the applications and some additional information.

A) FULL QUALIFIED NAME

For example

SKYNAM:AUTOMOTIVE:RACE:ENGMAN:CHALLENGER:CHALLENGER4:0000001234

It contains the following information:

- it is a Skynam machine,
- in automotive,
- used in racing
- for engine management
- belonging to the "Challenger" family
- of the Challenger4 type
- serial number 0000001234

B) POSSESSOR

For example

SKYNAM:TOTO

Means that Mr or Miss or Company TOTO has been taking possession of the machine.

If you are not TOTO, you can't tune the machine until you take possession of the machine (see below).

If the machine has not been locked, the possessor is

SKYNAM

C) USER APPLICATIVE

If you connect to a machine that you have to tune yourself and do not know which Tuneware to use, the User applicative helps you to choose the good Tuneware.

For example

SKYNAM:AUTOMOTIVE:RACE:ENGMAN:CHALLENGER:CHALLENGER4:VACUM#500

It contains the following information:

- the software is dedicated to a Skynam machine,
- in automotive,

- used in racing
- for engine management
- belonging to the "Challenger" family
- of the Challenger4 type
- running with an RPM / Pressure software (without motorised throttle nor any option) V5.00

II) MACHINE POSSESSOR MANAGEMENT :

The possessor is (hence the name) the person who owns the machine (see "Access rights management" file).

NOTE

It is not possible to take or release possession of a machine with an 'All Users' Winjall Licence. To execute these functions, you need to get a name specific licence with a dongle from Skynam.

This means that with an 'All Users' licence, if you have got a protected machine (somebody has taken possession of this machine), you cannot tune it completely:

- Depending of the kind of machine (and Tuneware), only some maintenance functions are available.

- More, you cannot upgrade the machine with a standard Tuneware (directly provided by Skynam). You need to get a specific tuneware from the possessor of the machine.

The Possessor management sub-functions are the following:

A) TAKING POSSESSION OF MACHINE

With this function the user can declare he is taking possession of the machine: Winjall asks the machine to write down the new owner's name as the holder of the Winjall user licence. If the possessor of the current machine is not compatible with the one that is being inserted (consequently, this user has no rights on this machine), all the data and the application software will be erased and the user recovers an empty machine. He then has to upgrade its machine with one of the compatible Tunewares he has got.

B) RELEASING MACHINE POSSESSION

With this function the user can declare he is giving up machine possession: Winjall checks the one who wishes to release possession is the one who possesses it. If not, the action won't be taken. If possession is released, all the other users can get to the machine data, according to their level of access rights.

III) MACHINE UPGRADE :

You can upgrade a machine to a new Tuneware (recommended when Skynam provides new Tunewares version on its web site www.skynam.com), after having imported data from your old machine specific Tuneware to the new Tuneware version (see function 'Upgrade data from another Tuneware' in the tuneware functions paragraph).

To make an update, Winjall asks the user to select the new Tuneware containing the upgrades.

NOTE

It is not possible to upgrade a machine on which someone else has taken possession, unless you have a got a name specific tuneware from him.

The only other solution is to take yourself possession of this machine (which will erase any data and application software in the machine), and then upgrade the machine with your Tuneware. This operation needs that you have got yourself a name specific licence with a dongle from Skynam.

The machine upgrade sub-functions are the following:

A) SELECTIVE UPGRADE

Winjall can only upgrade the machine programmes (system, application) that are not of the same version as the Tuneware. The machine data application is always upgraded with the one of the Tuneware.

B) FULL UPGRADE

Winjall systematically upgrades the system programme, the application programme as well as the application data in the machine with the ones of the Tuneware.

IV) MACHINE TRANSMISSION ID:

The transmission ID is the transmission Identifier of the machine. Each of the machines on the Winjnet network has to have its own and it has to be different from all the ones for the other machines in the network (like an IP address in the TCP-IP network). This function has two sub-functions:

A) SEE MACHINE TRANSMISSION ID

With this function you can display the transmission ID for the selected machine.

B) CHANGING MACHINE TRANSMISSION ID

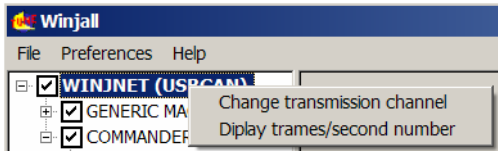
With this function you can force a transmission ID on a machine.

PREFERENCE FUNCTIONS

With these functions the user can select his preferences. His choices are recorded in the Windows Register.

I) WINJNET POPUP MENU:

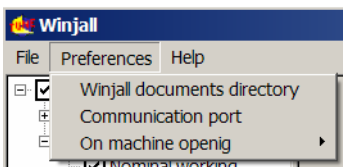
By right-clicking on 'WinjNet' in the machine machines tree, you can display a popup menu to select which PC connection port (Com1 to COM8 or USB-CAN) is connected to the Winjnet network.



With an additional function you can visualise the number of data frames per second that are being exchanged between the machines and Winjall via the selected communication channel.

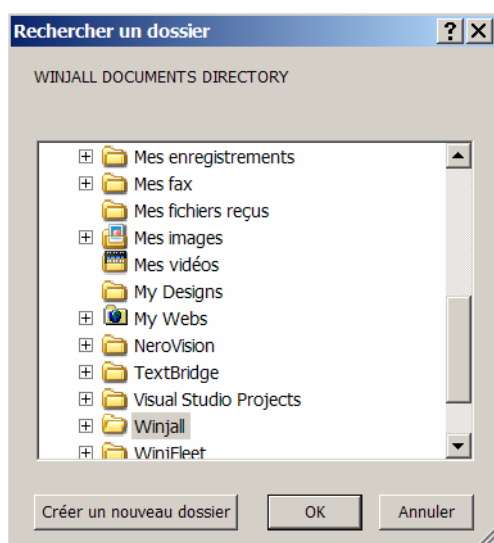
II) PREFERENCE MAIN MENU :

Via the 'Preference' menu in Winjall main window :



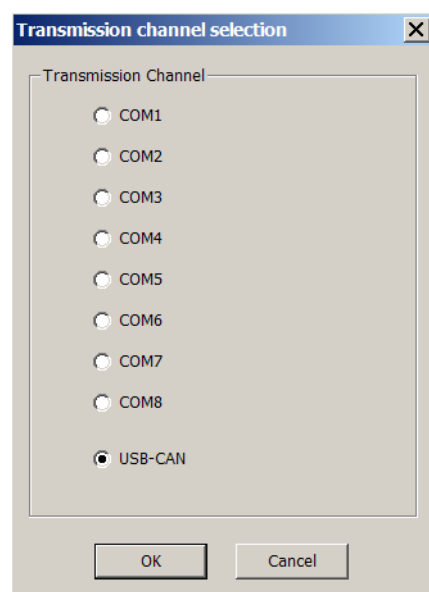
WINJALL DOCUMENT DIRECTORY:

The user can choose the basic directory in which Winjall can find the Tunewares for tuning the machines (including a local network directory).



COMMUNICATION PORT:

With this menu you can select which PC connection port (Com1 to COM8 or USB-CAN) is connected to the Winjnet network.



ON MACHINE OPENING:

You can activate or de-activate the automatic opening of the Tunewares when re-connecting to the machines for a new Winjall session.

